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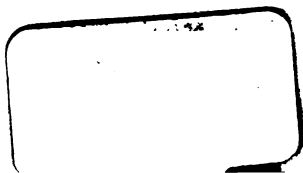
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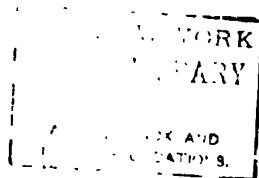
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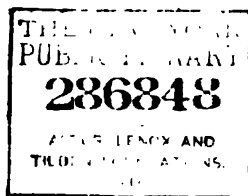
THE STARS AND THE ANGELS;

OR,

THE NATURAL HISTORY OF THE UNIVERSE
AND ITS INHABITANTS.

"There are differences of administration, but the same Lord;
and there are diversities of operations, but it is the same God
that worketh all in all."—1 Cor. xii. 5, 6.

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PREFACE.

THE views contained in the present Essay form a part of the Author's meditations on *the harmonies of science and revelation*. It appeared to him, that the continual retreat of Bible interpreters, before the onward march of natural science, was due to the false position which they originally occupied ; and that the constantly apologetic attitude which the Bible was thus made to assume, would never be changed until that position was abandoned.

The idea that what is called the operation of the laws of nature, is less immediately the act of God than what is called miracle, has, he thinks, been too hastily admitted by theologians ; and that, in consequence, they have been led to view with suspicion, or even a grudge, the aggressions of science on what seemed to be their professional domain. The consequence has been, that with such advocacy, the argument for the being of a God, has been growing weaker and weaker by every new discovery that ascribes to the action of law the glories of God's hand-work.

Yet, why should such a concession be made? The *existence* of a law presupposes the existence of a legislator; and the *operation* of a law presupposes the existence of an executive. In the one, we have a constant testimony to God's infinite wisdom and goodness; in the other, we have a visible exhibition of present power. Moreover, if the operation of law be the general style of God's administration, as it unquestionably is, it must be the most characteristic; and if it be the most characteristic, shall we dare to say that it is not the most glorious? The Christian who knows his Father best, is the man who would sooner recognise Him in the still small voice of his normal administration, than in the whirlwind and the earthquake of lawless power.

The apprehension of this principle in the Author's mind, was as if a new instrument of investigation had been put into his hands. He was able to look up into the heavens and there behold the God of the Bible;—he was able, also, to look into the Bible and there behold the God of nature. Nature and revelation seemed to approach, and at length to merge into one beautiful whole; and thus these twofold manifestations of God's glory seemed to stand out, in evident perspective, with greater clearness and serener beauty than they had ever done before. Far off in the background, and subject to no parallax, seemed to dwell the silent decrees of an eternal God. In front of them,

rose up the *inorganic* administration, with its mechanical and its chemical laws. Still further forward, and yet distinct from all behind, stood out the *organic* administration over the vegetable and the animal kingdoms. Nearer yet, and higher still, rose the *intellectual* and *moral* administrations, with their intellectual and moral laws ; while in the very foreground, appeared the *personal* administration of God in Christ, not only as He appears in revelation, but as He daily manifests Himself by His word and Spirit. All of these, which at one time appeared mysterious and conflicting, seemed now to be the very perfection of harmony and beauty, because each of them was seen to carry on its own operations *without interrupting or suspending the action of the others*.

In the present Essay, the Author has purposely confined his attention to only one department of his subject, viz, the operation of law in the natural history of CREATION. A wider and still more interesting field has been left untouched, where the same principle lights up the natural history of PROVIDENCE. This, however, is a topic which he must leave to the labours of other minds, as he can scarcely hope to find leisure, even though he had the ability, to do justice to so great a theme.

November 1857.

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THE STARS AND THE ANGELS.

PART I.—THE STARS.

CHAPTER I.

THE BIBLE ADMITTED AS A WITNESS.

WHERE am I? and what am I? are the first questions that man whispers to his own heart, when, first awaking beyond the consciousness of a merely animal existence, he looks out into the world around him. In some, it is God's stray child looking for and feeling after his Father; in others, it is, as it were, the first flutter of the young eagle's wing when he first bends his kindling eye over the precipice upon which his nest is hung. To the one, the Bible is a loving Father's message to His wandering child, telling him who, and what, and where he is; and revealing all other necessary truths both of the past and the future. To the other, Science reveals external nature as it presents itself to the outward eye; and invites a never-ending research into the mysteries of creation. Both,

however, are from God, both answer the same questions ; and if both be true, it is impossible that their testimony can ever be conflicting : on the contrary, it will be found that when both are allowed to give evidence upon any subject, they will reflect light upon each other's statements, and corroborate each other's testimony.

For this reason, the author is of opinion that the time has come when Science and the Bible together (each interpreting the other) may be successfully used in attempting to bridge over the mysterious chasm which separates the realities of a seen from those of an unseen world. The darkness and uncertainty which at present prevail on this deeply interesting subject are, in his opinion, due chiefly to the methods which have been adopted in its treatment.

One error, he humbly thinks, consists in admitting *a priori* reasoning upon the subject ; that is to say, commencing the investigation by determining what must be, or should be, or cannot be, or what we could not conceive God to do or omit doing, and then interpreting the phenomena, and selecting analogies to illustrate and corroborate the theory. The result of such a method never can be satisfactory, because no real progress can ever be made by its means. The truth is, that in dealing with a subject of this kind, so far from preconceived limitations or speculations being favourable to discovery, they are the greatest hindrance ; whereas, the more unprejudiced our method of procedure, and the more child-like our readiness to receive and follow up every indication of truth, however contrary to our preconceived opinions, the more progress shall we really make ; not only because we have more security in regard to each step of our progress, but because we shall not be bewildered with

many hypotheses, which are not only fictitious but conflicting.

A second error, he thinks, consists in excluding Scripture testimony upon scientific subjects, *where that testimony is possessed of an inductive character*. There has been too long a misunderstanding on the part both of philosophers and theologians as to the precise position which the Bible holds in regard to science; and this misunderstanding has produced an unnatural separation, by which they are held to be mutually independent of each other. During the reign of the old deductive philosophy, this, if not a proper arrangement in itself, was at least a necessary one under the circumstances; but now that we have abandoned the deductive, and rigidly adhere to the inductive philosophy, such a divorce is not only unnecessary, but injurious.

There is good reason why such a book as the Arabian Nights' Entertainments should be read apart from all our studies of geography, history, physiology, and natural philosophy; but it is not so with the Bible. Its scenes are not laid in fictitious localities, nor its events unconnected with the world as we find it. On the contrary, it is linking itself with every known fact, more strongly and more distinctly every day; and history, geography, and every other science, are continually bringing up fresh evidences of its entire truthfulness.

The Palestine of the traveller is the same holy land that was trodden by the Son of God. The earth of the geologist is the same of which Moses wrote in his account of creation (although we have erred in interpreting it as a literal history); and so, in like manner, the heavens of the astronomer are no other than those into which Christ ascended when He parted from the wondering Galileans on the Mount of Olives. All truth is one; and

if we, by a kind of stereoscopic vision, can see the same objects with the scientific, and at the same time with the historic eye, and find both representations to agree, they would stand out before us with a distinctness, and a visible reality, such as they could not otherwise assume. The scientific Christian may know and understand things connected with the Bible, which the unscientific Christian cannot know; and the Christian philosopher may know and understand many things connected with science, unintelligible to the man who has not studied his Bible.

Upon various occasions have the friends of Christianity been startled by the confident assertions of the men of science, as to some alleged fact which had been discovered inconsistent with the Scriptures; and, on other occasions, the friends of science have been startled by the confident assertions of Bible interpreters, as if the authority of Scripture were to be placed in opposition to scientific facts, about which there could be no mistake. Science and Scripture were in both cases outraged by human presumption: the pretended discoveries by which the Bible was to be put down, turned out to be nothing more than speculative abortions, which a little more philosophy buried out of sight; and the dogmatic assertors of Scripture authority against scientific facts, have been corrected in their turn by more enlightened interpreters of Bible phraseology.

What an evidence does this afford of the Divine origin of Scripture! Not only in humanly devised religions do we find perpetually recurring fallacies and scientific errors, indicative of the state of education among the people and the age that produced them, but in all merely human productions, of whatever kind they may be, we find abundant evidence of ignorance and misinformation. So true

is this, that it would be almost impossible to write in an age of comparative darkness (except by Divine inspiration) that which will abide the light and the scrutiny of a future day.

It appears to be a fundamental principle of the Holy Scriptures never to reveal directly any philosophic truth, but to speak systematically in the language of current knowledge. Even in its most exalted revelations it adapts itself to the habits of thought and expression of the age and country to which it was primarily addressed. A little consideration will shew us that this was absolutely necessary. To have propounded one new doctrine in science, or to have anticipated one invention in art, would have been contrary to the very nature and intention of revelation. The Bible is a book for all men in all ages, whereas science and art are a progressive and never-ending career of discovery and invention; if the Bible, therefore, made any revelations whatever in such a field, it would have betrayed a human origin, and a human mind perhaps a little in advance of the age which gave it birth, but useless for ever after. One of two things was necessary,—it must either systematically avoid scientific revelation altogether; or, speaking the language of science in its furthest development, it must once for all lift the veil from the face of nature, and, by one revelation, abolish further effort and further inquiry. In this respect, then, the Scriptures may be said to stand on a level with other writings that are not inspired; but even in this they exhibit the most wonderful evidence of their Divine inspiration; for, while they carefully refrain from making any direct contribution to the scientific knowledge of the world, they have never stumbled upon any statement which will not abide the light of advancing

entire-

science. This feature appears to be altogether super-human : they have preserved a thorough consistency with all that science has yet discovered ; so that in the light of the nineteenth century we read the productions of the world's infancy, and discover no error and no weakness. The ignorance that then prevailed in regard to both art and science was very great, and yet the writers of Scripture were never seduced into a scientific blunder, shewing that, notwithstanding their bold step and unhesitating walk, they were guided by One who, though He knew all things, did not intend to reveal in this manner anything but the one thing needful, which neither art nor science was capable of discovering of themselves.

How interesting, also, to meditate on this aspect of our Saviour's sojourning on earth. The human mind of Jesus, so pure, so calm, so cultivated, could not for thirty years have conversed with nature and with God without making large discoveries in science, and anticipating mighty achievements in art ; and yet not one word was allowed to escape His lips that betrayed even the consciousness of such a knowledge ; that which would have raised Him higher than Aristotle or Newton, was equally suppressed with that which would have made Him mightier than Cæsar.

How then can the Scriptures throw any light upon science if they systematically avoid any direct revelation ? The answer to this is as important as it is simple—It is the FACTS of Scripture that are the legitimate subjects of scientific inquiry ; and it is the purpose of the following chapters to shew that they form most valuable contributions to the cause, the more so as they are gleanings in a field not accessible to us in the present day. The soldier

who had part of his body shot away, and yet survived the accident, enabled the physicians to know, by actual and visible experiment, what changes took place upon different kinds of food taken into his stomach; and his case was regarded by the medical profession as a most valuable opportunity of ascertaining facts which otherwise might never be known. A traveller, in like manner, who, by some rare accident, is enabled to examine some locality which was never before or may never again be visited, would be an extremely valuable contributor to any science dependent on such phenomena as he had witnessed. It is upon this principle that the facts and phenomena attested by Scripture ought to be valuable to the scientific inquirer, because they are, many of them, disclosures of things now not seen, and yet intimately connected with the things that are. It was impossible that a narrative which describes events and phenomena connected with heaven and earth, God and man, angels and devils, that there should not be many facts related which, when viewed in connexion with modern science and with each other, are possessed of the highest scientific value. An objection to receive them as legitimate contributions to natural science cannot be justified on any grounds consistent with the acknowledgment of their truth; and although they may appear to some as if they were incapable of being incorporated with the ascertained results of modern observation and experiment, a more mature philosophy will find in them, not isolated, and mysterious, and heterogeneous elements, but connecting links and consistent phenomena.

CHAPTER II.

THE BIBLE'S CONTRIBUTION TO ASTRONOMY.

THE doctrine of the Incarnation, Resurrection, and Ascension of Christ is the grand connecting link between Astronomy and a future state. An unincarnate Deity needs no material throne on which to dwell as the seat of His empire; and the mystery of a merely spiritual existence is too dark to enable us to infer with any certainty a connexion between the universe of mind and the universe of space; but when we are assured that the body of Christ ascended into heaven, carrying with it the flesh and bones which He presented to His disciples as the proofs of His resurrection, we have conclusive evidence that in the material heavens there is a material world, in which the material body of our glorified Saviour dwells. Nor is His the only human body there. Enoch and Elijah, and the saints who rose after His resurrection, form as it were the members of the glorious visible court of heaven. If He, then, be exalted above all principalities and powers, and thrones and dominions, all things being put under His feet, then can we inform the astronomer that the great and only Potentate, the King of kings and Lord of lords, to whom every inhabitant of every star is subject, and at whose name every knee must bow, not only on earth but in heaven, is the man Christ Jesus, the Jew who was born in Bethlehem, died on Calvary, and

ascended to the throne of the universe from the Mount of Olives.

If, then, the mere astronomer be able to astonish us with his discoveries of the inconceivable magnitude of the starry heavens, compared with which our tiny planet sinks into almost infinite insignificance, we, in return, can astonish him by the discovery, that this little world is a very metropolis in creation, to which every finger in the most distant stars will yet be pointed as the scene of the most wonderful display of the riches of their Creator's glory. The astronomer may inform us of distant worlds, evidently fitted to be the abodes of intelligent and moral beings; we, in return, can inform him that we have already historically made their acquaintance, can tell the names of some of them, and already know something of their actions and their character. We might even whisper to him the solemn truth, that if he be not yet an heir of glory he is but the distant explorer of the future kingdom and inheritance of the saints. He may have already pointed his telescope unwittingly to the very star where at present dwells the Judge whose voice he will yet hear, and in whose presence he is yet to stand; and when the mere astronomer has bidden an eternal farewell to sun, moon, and stars, the acquaintance of the Christian philosopher with these magnificent exhibitions of his Father's glory will only be about to commence.

When Moses, from the top of Pisgah, was bidden look upon the far-spread landscape of the promised Canaan, he was permitted to regard it as the inheritance of Israel; and although the true inheritance was something better than an earthly possession, he was at the same time assured that the earthly possession formed a part of it. Moses would have been unworthy of the privilege if he

could look upon it without emotions of the noblest enthusiasm.

So should the Christian look up into the heavens above him, and say, "Though this is not the object of my fondest desires, yet do I rejoice to get even this outward glimpse of my Father's kingdom. To me these glorious stars are far more interesting than they can ever be to the mere astronomer. He confesses that he knows nothing of their inhabitants, but, blessed be God, I know something about them. I know that in some of these distant orbs, in some particular spot in the heavens—its right ascension and its declination could be communicated to us—in some constellation dwells the glorified body of my Saviour-God. He whose person is dearer to me than life itself—who, though absent in body, is even now present in spirit, and warms and sustains my spiritual life by His union to my soul—He is there, ruling the armies of heaven and the inhabitants of every earth; thither He ascended more than eighteen hundred years ago. Upon that throne He has witnessed the gradual triumph of His cross and the rising of the Man of Sin. From that throne he sent forth the spirit of the Reformation, and sustained His martyrs in their fiery trials; and from that throne He will again descend to earth, at no very distant period,* to judgment, returning to our planet in the same manner as He departed."

"In another part of the heavens, or it may be the same, the man Gabriel dwells, that Gabriel who appeared to Daniel at the beginning, and also fifteen years after; on both occasions to make him understand what would be in the latter day—the same Gabriel who, after more than five hundred years later, paid two other visits, six

* See Appendix C.

months apart, the one to Zacharias in Jerusalem, the other to the Virgin Mary in Nazareth."

"In every star that shines above me, and every nebula that contains a moral and intelligent being, there are the subjects of my Elder Brother the Prince, for there every knee bows in lowly adoration at His name. There is no star so distant that His sceptre does not reach—where His name is not loved or feared as well as known."

What an overpowering interest then does the Bible give to Astronomy ! Without it the astronomer is like a creeping insect confined to this island rock in the abyss of God's vast creation, gazing upwards to the glorious orbs above and around him, which must for ever be to him unknown—in sight, and yet unknown ! and when at length he sinks to sleep in dust, he shuts his eyes for ever upon all its glories, after having wondered that such a view should ever have been afforded him.

How different is it with the Christian ! He looks upwards too ; but he does so as when the weary traveller gains the first distant sight of home, knowing that he is going thither. He can afford to wait. He may have no gigantic telescope to sweep or scale the heavens, and thus gain anticipatory views of suns and firmaments, but when he sees the astronomer busy, he can say, "I shall see them better afterwards ; for if they are Christ's, then are they also mine."

CHAPTER III.

THE INFIDEL ASTRONOMER'S OBJECTION.

IN the eyes of the infidel astronomer, these views will appear both presumptuous and absurd. They ascribe to this planet a position so distinguished in creation, that on no other world could the great events be surpassed, or even repeated, which have transpired upon its surface—events which, if true, deeply affect every moral and intelligent creature in the universe. Nor would his objections be at all wanting in plausibility.

With how much effect might the infidel lecturer on Astronomy conclude his illustrations of the grandeur of the starry heavens by saying, "And yet, gentlemen, we are told that the Creator of such a universe as this, singled out this little planet from among the millions of millions of brighter and better worlds, clothed himself with the body of one of its animals, died to secure their happiness, and now, reinvested with that same creature's nature, sits upon the throne of the universe in their behoof, promising to share with them his government over all worlds, and to all eternity. This, gentlemen," he might continue, "was all very well in the infancy of science, when the heavens above, and the earth below, seemed no unfair division of the universe; when an ideal paradise was considered necessary to counterbalance the preponderating attractions of the substantialities beneath;

and a visit to our busy world seemed no incredible supposition in regard to Him, who, seated in serene repose in heaven, could not but be interested or annoyed, as the case might be, by the stirring scenes of human passion and enterprise below. Then, there was no selection ; if God must become incarnate, He had no choice but to be a man. If He must tread on a world's surface, where but on earth could He be received ? Now, however, times are changed : your God is not the God you conceived Him to be ; His empire is rather more extended than you formerly imagined, and millions of millions of other worlds share His affections and acknowledge His government. Why to you alone should this mysterious visitation have been made ? Why insist on so special a condescension here ? or, if you will demand so exclusive an interest in the thoughts of the Eternal, do not, I pray you, insist on such a monopoly of His regards, as that what has been done on this little earth could not again be performed on any other star. But if even this be insisted on, do, I entreat you, shew some little modesty, and if you must be the murderers of an incarnate Creator, withdraw at least your pretensions to sit with Him hereafter on His throne."

These objections have a very plausible appearance, but they only require to be analysed and examined in order to be converted to the service of Christianity. There are two distinct ideas conveyed in the objections,—the first is the improbability of any such events taking place on any world ; the second is the improbability of their taking place on our planet, in preference to any other of the millions of worlds which have been discovered to exist. The one is an improbability, founded on the greatness of God as contrasted with the insignificance of man ; the other is founded on the greatness of the universe as con-

trusted with the insignificance of the world on which we live.

The first objection, then, is that a God so magnificently great could not shew any personal or exclusive regard to the inhabitants of so very small a province of His empire. To this it has been answered, that the greatness of God manifests itself not only in the magnitude of His works, but also in the minuteness of His administration. This, however, is scarcely an answer to the real difficulty as presented by the pantheistic objector. He is quite willing to acknowledge the infinite minuteness, as well as the magnificent grandeur of God's government, because from the very nature of that government, it is the action of law, and not a personal and special interference, above and beyond the action of mere law. The operation of a law is universal, the personal revelation is peculiar. It is not wonderful that that which is universal should be found not only in every planet, but in every plant however minute ; and it is not therefore a satisfactory solution of the difficulty to point to microscopic phenomena as indicating the minuteness of God's administration, because it is not the operation of laws on our planet that constitutes the difficulty. If we could point to microscopic miracles, and special revelations of a personal God, the argument would be so far complete ; otherwise it can scarcely be said to meet the objection.

The true answer to this part of the argument is rather to be found in the distinction between physical and moral greatness, inasmuch as it would be folly to imagine that, in regard to God, either bulk or number should have any effect on our relation towards Him. It was the imperfection of philosophy that produced the difficulty—a little more philosophy is sufficient for its solution. We must

not forget that when we measure God's relation to us by time, space, or quantity, we apply a scale which has no reference to Him. His condescension would be no less if our world had been the only one in the universe; and it is no greater, because there are millions of others greater than our own. The glory which the work of redemption sheds on the Divine attributes is not physical, but moral. Had it been so, there would probably have been a nobler theatre chosen for its display: some grander world, or more central locality, would have become the scene of the incarnation of the Son of God. But we must remember that God's hatred of sin, and His long-suffering mercy towards the guilty, cannot be symbolised by magnitudes, however grand, nor receive any accession to their glory by suns or systems, however brilliant. As well might we complain that the ink with which Paul wrote his Epistle to the Romans was no better than that which Levi used at his receipt of custom; or that the paper upon which Sir Isaac Newton wrote his immortal *Principia* was made from some rags which had been discarded by a beggar.

The greatness of the moral and the greatness of the physical bear no relation to one another; and as in regard to God's existence, a thousand years and a single day are alike to Him, so in regard to His moral administration, all numbers and all magnitudes are the same. It is a grovelling imagination that would turn its stupid gaze from the brilliancy of God's intellectual and moral glory, as evidenced in the organisms of vegetable and animal life, and the sublimities of revelation, to fall down in ecstasy before a mere exhibition of physical extension and bulky grandeur. What difference does it make to God, who created the bee and built the elephant, who ordained gravitation and spake light into being, whether the uni-

verse He made was of this size or that—whether there was but one world, or ten thousand millions? Is He a greater God, because He has a great creation? Or is His attention more exercised, because the ten thousand millions of creatures on earth, which we *always* knew were the objects of His care, must now be multiplied by ten thousand millions more? The discoveries of Astronomy, therefore, astounding as they are, have neither created nor increased the difficulty, because it was a difficulty, not of quantity, but of principle—a difficulty fitted to excite wonder and praise, not doubt or perplexity; and the difficulty and the wonder were never expressed more forcibly, or with greater beauty, than they were two thousand years ago, when the Psalmist sang:—

“ When I consider thy heavens, the work of thy fingers,
The moon and the stars, which thou hast ordained;
What is man, that thou art mindful of him?
And the son of man, that thou visitest him?”—Ps. viii. 3, 4.

The second part of the argument, however, is more formidable, and it is this: Granting that such events *might* take place on some one world, if they be of such a nature that they could not be repeated on any other, how very improbable is it that this little planet of ours should be selected as that very one? As well might we suppose that a man entering a forest (the objector might say) in which only one leaf upon one tree was possessed of particular properties, and that he should by accident walk up to that very tree, and by accident pluck that one leaf, leaving the millions of other leaves untouched. It would add to the improbability, while it would also add to the similarity of the cases, if there were millions of other forests from which he might have made his choice.

We cannot suppose that by accident he would select the forest that contained the one tree, and by accident select the tree that bore the one leaf, and by accident put his finger upon the very leaf that he was in search of. So (says the objector) do the Scriptures require me to believe that of all the millions of nebulae in creation, our nebula (the Milky Way) was selected for the scene of the incarnation, and among the millions of suns composing it, our sun should happen to be the one selected; and, to complete the miracle, out of all the planets which revolve round the sun, our own little world should be the very one. This, he thinks, is too much,—too extravagant a supposition to be entertained or believed. And yet, wonder of wonders, it is true, and can be proved to be not only possible but certain. 7

Waving, in the meantime, the question whether the stars be inhabited or not, we must observe, in the first place, that Scripture does not assume any principle inconsistent with these most astonishing revelations of astronomy. What is more remarkable, a good deal of pains is taken to bring out this very wonder as a favourite mode of God's ways of acting—to pass by the great and the mighty, and to select some little neglected vessel into which the glory is all to be poured, in order to remove all doubt as to its being His own. Thus, to crown His work of creation He takes from the surface of the ground a little clay, bearing no greater proportion to the earth's magnitude than the earth bears to the universe of worlds, and of that humble dust He forms a man. To commence His Church He passes by all the great nations of antiquity, the Egyptian, the Assyrian, the Chinese; and selecting a poor wanderer from Ur of the Chaldees, he makes all the families of the earth blessed in him. Jacob was a

fugitive Syrian ready to die, David was the least in an obscure family in Judah, and thou Bethlehem wast but little among the thousands of Judah till out of thee came forth the promised Messiah. What was Palestine but a very little country among the kingdoms of the world, and what is the world but a little planet in the solar system, and what is the solar system but an undistinguished star in the Milky Way, and what is the Milky Way but a speck in creation, and what is creation itself but a tiny ray of God's glory ; and what is all this but an old story, which the Christian knew long ago, to the praise of God's wondrous love and redeeming grace ?

But the infidel will still say, "Granting that God should choose some such little planet as our own on which was to be performed the great work of redemption, is it not exceedingly unlikely that He should fix upon our earth more than any other ? If there be millions of other worlds, is it not a million of chances to one that He should not do so ?" The fallacy here consists chiefly in the application of the doctrine of probabilities to that which is not a proper subject of its laws. We may calculate the probability of any future event by counting the number of chances that are against it, but to apply this to a circumstance or coincidence that has already taken place is clearly an impropriety. As well might the Prince of Wales, when a child, have been persuaded that his mamma was not the Queen because she was only one among millions of other women in England. But this is not all. Not only is the principle fallacious, its facts are untrue, being altogether unwarranted by anything that science has yet revealed to us. Supposing that the incarnation were a future and not a past occurrence, and that it had been revealed to us that the Son of God would at

some future period become the child of a fallen race, there is nothing as yet discovered by science which would make the chances very great against our world being selected as the theatre of this great event.

But as this argument will occupy a number of chapters, it is not necessary here to do more than indicate its general nature. *First*, It can be shewn that science does not give us any reason to conclude that any great proportion of the celestial bodies are capable of sustaining animal or vegetable life ; *Second*, That out of those which are capable of supporting animal and vegetable life there is reason to believe that not one in a million is inhabited by a race of intelligent and moral beings ; and, *Third*, That out of this extremely minute proportion, another unknown and probably only very small number is inhabited by fallen intelligences, to whom alone the incarnation would be necessary or desirable.

CHAPTER IV.

THE MOON.

WHEN Robinson Crusoe was wrecked upon the desert island, we are told that it was a matter of deep interest to him to ascertain whether it was inhabited or not; and if other islands had been in sight, he would no doubt have been anxious to know whether they also were peopled, or whether he was a solitary man, without companions, or neighbours, or friends. In like manner, to us, when looking out from this island world upon the thousands of other worlds around us, the question becomes deeply interesting, Are there in these distant stars fellow-beings like ourselves, who think and feel, and love and worship, as we do? or are we alone in the universe, wandering along its silent solitudes? and is each star no more than a desert world, a bleak and naked rock left floating in the wide wilderness of heaven?

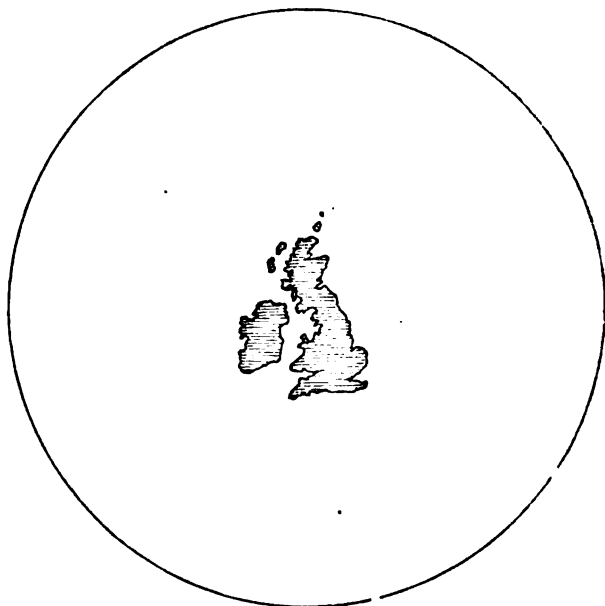
This has long been a favourite subject of speculation, and of late years a good deal of interest has been excited by the views which have been adopted on both sides of the question. One writer endeavours to shew that the earth, in all probability, is the only world that is inhabited; and another, after establishing, by *deduction*, that every star *must* be inhabited, brings forward very strong arguments to shew that we have no proof that they are not. It is difficult to believe that either of these extreme

views is the right one; for although it could be proved, on the one hand, that our planet alone, in the solar system, is capable of supporting vegetable and animal life, still there are thousands of millions of other systems among which there may be millions of planets as habitable as our own; and, it may be, the abodes of happier and better beings than ourselves. Let us therefore examine the celestial orbs, one by one, and class by class, to endeavour to ascertain what kind of worlds they are, and what kind of probability there is that they are inhabited.

Our first voyage of discovery will be directed to the moon, the nearest of all the heavenly bodies to this earth. Astronomers inform us that the moon is about 240,000 miles distant from the earth—a great distance indeed, but yet nothing compared with the vast distances of other worlds. A cannon-ball, shot from the earth to the moon, and flying at the rate of a thousand miles an hour, would hit it only at the end of ten days; and yet a ray of light, reflected from the moon, will reach our earth in two seconds. As to its size, although it is much smaller than our own world, it measures 2160 miles in diameter; so that a railway train, running at the rate of forty miles an hour, would require a whole week to travel round it. Perhaps the diagram on the next page will give a better idea of the size of the moon, by shewing how much of it would be occupied by the British Isles, if they were laid down upon its surface.

In some of our future chapters, we shall have occasion to shew that not only the angels, but the resurrection bodies of the saints, will be able to travel from star to star with great velocity, and that we shall be able to visit not only the planets and satellites of the solar system, but the distant stars and nebulae that hang out their glories in

the midnight sky. We shall anticipate the privilege in imagination, and on the wings of science take our flight for a season to see what is to be seen.



We spring upwards from the earth, and with a gentle flight, at the rate say of ten miles per second, attain in one hour the distance of 36,000 miles. Let us stay our flight for a few seconds to look upon the strange scene that now presents itself. We turn our eyes downwards upon the earth below. Is that the earth? We expected to look down upon land and water, continent and island, spread out as on a map beneath us : what we see, is a great orb wrapped in a gauzy envelope of bright azure

blue. We look in vain for the great outlines of Europe, or Asia, or Africa, or America : they are all lying covered beneath that sea of air, which, though it is full forty miles in thickness, presents at this distance a sharp outline as of a very distant cloud. We look around, and oh, how strange ! the heavens are black—black—black than night ; although the sun, unchanged in disc, pours his cool light in rays of terrible intensity. O for the softening influence of the earth's blue atmosphere ! The heavens are black, but the stars are shining with tenfold brilliancy. Sirius is sending his streaming rays towards us, as if the sun himself were shining out from behind some chink of heaven. Venus, and Jupiter, and Saturn, and Mars, are each of them projected with a milder radiance upon the black vault of night, and, though with discs no larger than before, with a distinctness of feature and outline that even surpasses the dim visions of the telescope.

As yet the moon appears not greatly larger than before ; we therefore resume our flight, and in other five short hours have neared the surface of our well-known satellite. Having selected a landing-place, we gradually slacken our speed, and within seven hours from the commencement of our flight, we stand upon the summit of one of the lunar mountains.

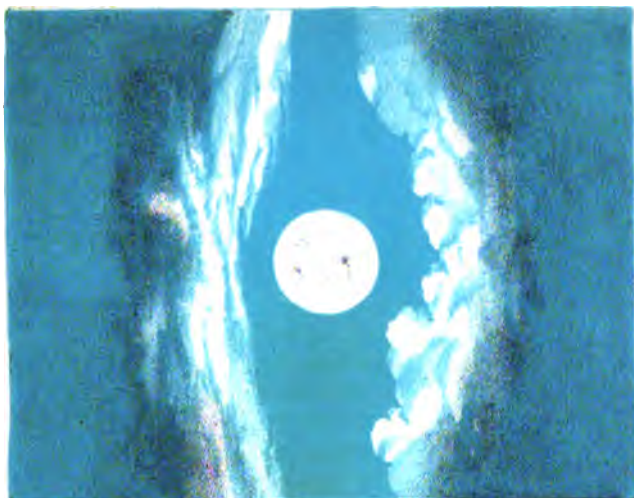
Everything here is upon a gigantic scale, far beyond any scenery to be found on earth. We are looking from a height of 17,000 feet far down into a circular valley of magnificent extent, stretching away over rock, and gulf, and mountain, for upwards of fifty miles, where at last the opposite barrier rises in sheer precipice, towering up to the heavens thousands upon thousands of feet in height. In the centre of the valley stands a mountain,

shaped like a rugged obelisk, its base descending into a great chasm, that yawns with deep and open mouth in the middle of the valley, and its top stretching upwards in an unbroken line 4000 feet into the sky. Yet, strange to say, everything looks small, and every place seems near. The absence of an atmosphere, the ruggedness of the mountains, and the hardness and abruptness of their shadows, all conspire to produce this effect.

We turn to look upon the scenery behind, and there a still wilder landscape opens to our view—hills upon hills, peaks upon peaks, rise in succession before us, as if the satellite on which we are standing, after boiling up its slimy lava into mountain circles and suddenly becoming cool, had afterwards burst its rugged crust into colossal fragments, and sent its liquid contents oozing out into mountain ridges, or flowing out in broad lava streams. Rents, and pits, and yawning caverns, traverse in irregular lines the fractured country, and rocks of every size and shape lie scattered all around.

Such is a specimen of lunar scenery ; now let us look upwards on the lunar heavens. The sky is still as black as it was midway from the earth, the sun is still staring upon us with the same fierce glare, and the stars, which still seem to shine with supernatural brightness, are the only objects of beauty that meet and refresh the eye. There is Orion ! there are the Pleiades ! while far down upon the rugged horizon, Saturn with his rings and moons is slowly sinking from our view. How slowly he sets ! and how slowly the sun is sailing along the star-bespangled sky ! This reminds us that the lunar day is equal to twenty-eight of ours.

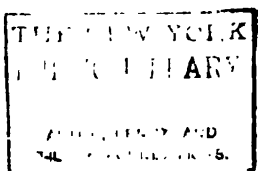
We now sit down upon the silent mountain to medi-



MOON AS SEEN FROM THE EARTH



EARTH AS SEEN FROM THE MOON



tate, and weary for a sight of any living thing ; but all is dead and still. There is no billowy ocean curling its waves in the distance—no majestic river—no streamlet gushing from the hills. There is no beast, nor bird, nor insect, nor even a blade of grass to adorn its blasted soil.

But look ! the sun is disappearing, and a dark object is stealing slowly over its flaming disc. It is an eclipse of the sun. Further and still further the intervening earth encroaches on its diminishing glories, until its entire surface has been veiled. And now, how splendid the result ! The great black disc of the earth is plainly seen projected on a light radiated ground, and having a thin brilliant thread of crimson light, which throws over the darkened landscape a rich crimson glow.

The eclipse is over—and now, before departing, we descend the mountain side. How strange the sensation ! we feel so light, and our footsteps so elastic. Like buoyant balls we bound along, and leap without difficulty high into the air. The explanation is simple—the earth, being nearly a hundred times heavier than the moon, attracts our bodies much more strongly. Upon the moon, therefore, so far as weight is concerned, we could lift and carry with ease a rock that would weigh more than a ton if it were on the earth. We might throw a stone without difficulty more than a mile in distance ; and as there is no atmosphere to diminish the force of the explosion, or to retard its passage while it flew, a ball might be discharged from a cannon with such an amount of force as to enable it to revolve round the moon for ever, if it could only clear the tops of the mountains.

CHAPTER V.

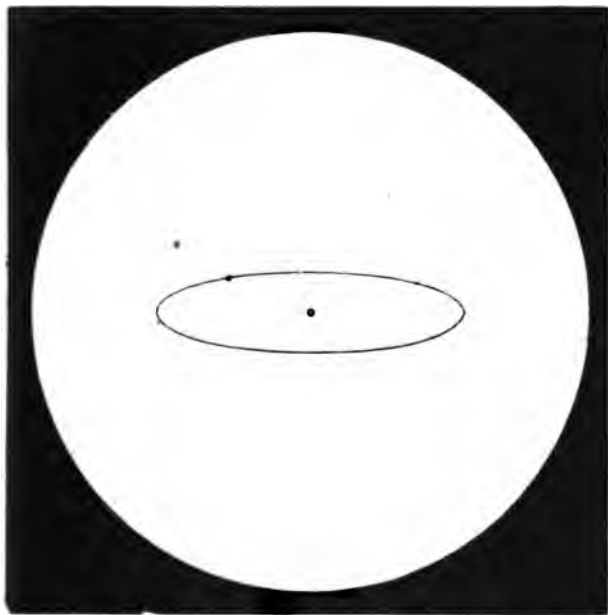
TELESCOPIC VIEWS OF THE SUN.

ALTHOUGH the sun and moon appear to us to be nearly alike in size, in reality the one is 50,000,000 of times bigger than the other, its diameter being 883,000 miles. If we could suppose a necklace thrown round the body of the sun, composed of gigantic beads strung together, each bead exactly the size of our moon, it would require 900 of these worlds hung side by side to girdle its circumference.

It is not easy to conceive this great difference between the bulk of the one and the bulk of the other ; but if the 50,000,000 of moons that would be required to make up another sun were all strung together in a line, the length of the chain would go round the orbits of all the planets of the solar system, including even that of Neptune.

The reason why they appear to be so much alike in size is, that the larger body is much more distant than the smaller. If the sun were brought as near to our world as the moon, it would cover almost the whole heavens ; it is because the sun is 95,000,000 of miles away from us that he appears so small. Some idea of this distance may be formed from the fact, that light, which comes from the moon in two seconds, and could fly round the earth eight times in one second, requires not less than eight minutes to travel from the sun to the earth.

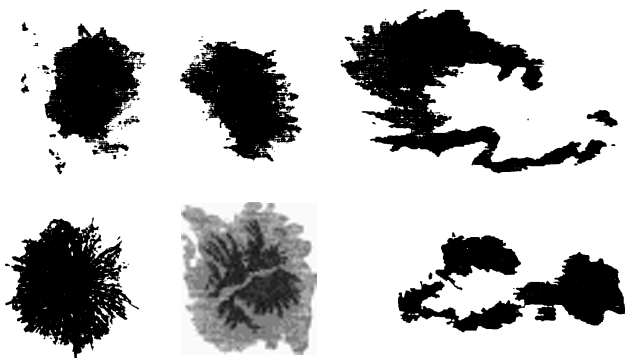
The gigantic proportions of the sun, its vast distance, and the intensity of its light and heat, are each of them so wonderful that it is difficult to form an idea which would be worthy of the subject. In regard to its size in proportion to our earth, it is more than a million of times larger, and its diameter would stretch far beyond the orbit of our moon,—that is to say, if our earth were placed in the sun's centre, not only would the moon have plenty of room to move round the earth in its own orbit, but even at that distance it would still be 200,000 miles *inside* from the surface of the sun.



In regard to the intensity of its light and heat, it has

been found that one of the brightest artificial lights which we can produce appears as a dark spot when held between the sun and the eye, and the most intense heat which we can obtain by combustion cannot be compared with the heat that emanates from the sun.

When viewed through a telescope, with coloured or smoked glass to protect the eye from its intense glare, there are usually visible upon its surface a number of dark spots or patches, each surrounded by a border, which generally corresponds in shape with the spot itself, and which sometimes encloses several spots in company.

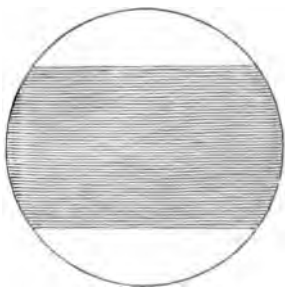


As they are found to pass along the sun's disc always in the same direction and with the same velocity, they have been the means of proving its rotation every twenty-five days ; and it sometimes happens that spots, after passing along the disc and disappearing at its edge, re-appear on the opposite side, and continue their course as before. These spots, however, are not to be considered as permanent features of the sun's body, as they frequently

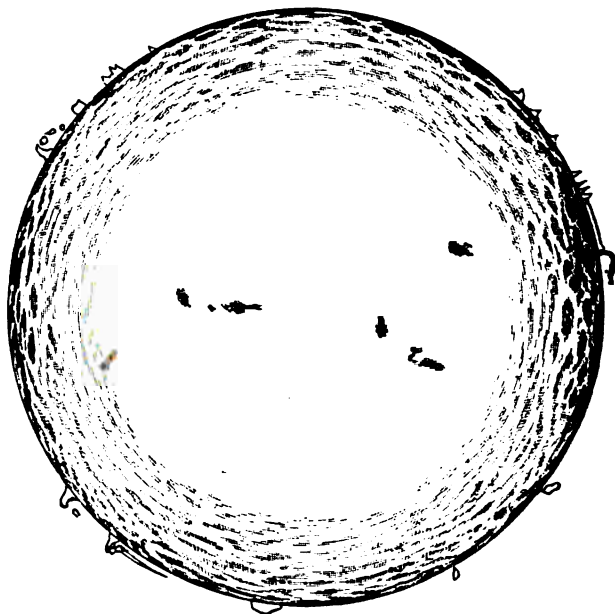
break out suddenly, and after gradually increasing in size, they begin again to decrease, and at length disappear ; the dark nucleus being the first to be obliterated. This process sometimes begins and ends within a period of twenty-four hours, but more generally their career is much longer ; sometimes extending to weeks and even months, according to their size. Their form and number are exceedingly irregular ; sometimes the sun's disc is entirely free from them ; at other times they are plentiful. Sometimes they are small and numerous ; at other times large but few—frequently so large as to be able to cover a space much greater than the earth. They have even been known to extend fifty thousand miles in diameter, which is six times greater than that of the earth. Sometimes, also, it happens that a spot, suddenly appearing and continuing visible for a few days, will as suddenly break up into numerous smaller ones and then disappear.

Another remarkable circumstance connected with these spots is, that they are confined within a narrow belt of the surface, seldom appearing beyond 35° of the equator on each side.

Independently of the spots, the sun's disc is by no means uniformly bright. The central part is considerably more luminous than the outer portions ; and it has also been observed that over the whole surface of the disc, but more especially near the edges, there is a mottled appearance, which astronomers compare to the wavy surface of an ocean of liquid fire,—or a stratum of luminous clouds, varying in depth and having



an unequal surface,—or the appearance produced by the slow subsidence of some flocculent chemical precipitate in a transparent fluid, when looked at from above.



It has also been observed, that at the places where spots are about to break out, the luminosity of the surface increases, and after the spot, with its umbra or fringe, has been formed, there are spaces around having strongly defined curved or branching streaks, more intensely luminous than the rest.

During a total eclipse of the sun, which it is well known is caused by the moon coming between the sun and the

earth, we are able to get a sight of what cannot be seen at any other time. Thus, if we wished to see some object at a distance behind a candle, we find it necessary to screen the light of the candle from the eye, to enable us to see more distinctly the darker object behind. Now, the moon performs this service for us, but only during the time of a total eclipse, for so long as there is the least portion of the sun visible, it dazzles our eye so as to obliterate the fainter objects which can be seen when the sun is entirely hid behind the moon.



From an original drawing by W. Swan, Esq., of the Total Eclipse of July 1861, as observed by him in Sweden.

The moment that the last ray of the sun has disappeared, the eye at once observes round the black circle of the moon a luminous fringe of light called a corona, such as painters represent round the heads of saints. It is brightest near the sun, and gradually shades off as the distance increases, but does not altogether disappear till it has reached a distance equal to the diameter of the sun on every side. Nor is this corona equal in luminosity all round. In some parts it is brighter than others, and here and there sharp rays of light rise in a conical form beyond the rest of the corona.

This great atmosphere, which we are thus enabled to see surrounding the sun, cannot be self-luminous, but must have its brilliancy produced either by the reflection or the refraction of the light proceeding from the sun itself. If it were a self-luminous substance, it would not be radiated or streaked as we find it, and it would make the edges of the sun appear brighter than the centre, because at the edges we should see through a greater depth of the self-luminous atmosphere; but as the edges are darker than the centre, it follows that the exterior atmosphere, by obstructing the rays which pass through it, hinders rather than helps the luminosity of the sun.

A still more remarkable phenomenon has been observed during the total eclipses of the sun. As soon as its disc has been covered by the moon, little pyramids, tongues, flames, or flakes (for they assume all these forms) appear upon the edge of the black moon, having a pink or rose colour. That they are connected with the surface of the sun and not of the moon is proved by their being gradually covered by the moon's edge advancing on one side, and gradually uncovered as the moon retreats on the other. This being the case their size must be enormous,

extending in some cases several thousand miles beyond the solar surface, unless we suppose that the refraction of the sun's exterior atmosphere produces an optical illusion, similar to that occasionally produced by our own atmosphere, when rocks and waves at the horizon are elongated upwards to a very great extent. Still, under any circumstances, these objects must be of gigantic proportions, in many cases measuring more than a thousand miles.

The general opinion entertained by astronomers is, that the sun is a solid sphere, possessing a temperature not greatly different from our own, so that its habitability is by no means unlikely. Its illuminating and heating power is supposed to reside in an exterior atmosphere of flame or phosphorescent light; but this blaze is not necessarily hot to the inhabitants of the sun. For not only is there an intermediate screen of clouds, which become visible to us round the dark spots, forming the border between them and the luminosity round about, and which protect the habitable body of the sun; but also it is supposed that the sun's rays are not really hot, but are felt to be hot only when they pass through a "calorific medium," such as our atmosphere. The proof that this is the case is offered by the fact that the sultry plains of Hindostan are further from the sun than the snowy peaks of the Himalaya mountains. The spots on the sun are supposed to be openings in the exterior luminous atmosphere; the umbra shews the intermediate stratum that protects the inhabitants from the too fervent rays above, while the dark nucleus in the centre shews the dark solid and cool body of the sun below.

CHAPTER VI.

CELESTIAL CHEMISTRY.

IF an angel were to tell us that he had visited each of the bodies of the solar system, and found them all composed of nearly the same substances, we should be quite prepared to understand how this would be the case in regard to the planets, but it would require some explanation to convince us that rocks, and earths, and seas could be compounded so as to produce the sun, that great universe of fire. Yet so it is, for we have more distinct and intelligible indications that the sun is composed of the same materials as the earth, than any that would lead us to believe in a common substance among the planets.

Suppose that a traveller, wandering upon the mountains, came upon a spot where some ashes and charred wood indicated that a fire had been kindled by the side of a rock, he would be quite certain that the fire had been only recently extinguished if he felt that the stones were still so hot that he could not with safety touch them with his hand. There would be little danger of his supposing that the ashes and the charcoal were originally created in that place, and that the stones, since their creation, never had been cold.

Upon the same principle, we arrive at the conclusion that the earth was at one time a sun,—that the rocks, the earths, and the seas are, as it were, the ashes, or rather

the products of the conflagration,—and that the interior heat of the earth affords a crowning proof of the theory. Come, then, and let us learn from the chemist how such an extraordinary doctrine can be true.

Without entering into all the niceties of science, it may be asserted as a general truth, that all the substances of which we have any knowledge are either combustibles or the supporters of combustion. A chemist will perhaps object to this way of stating the fact, but he will not deny that it is sufficiently correct for all the use we are to make of it. Among the combustibles, we place such substances as phosphorus, sulphur, charcoal, hydrogen, zinc, iron, and all the other metals; and among the supporters of combustion we place oxygen and—— but, indeed, oxygen may be said to be the only supporter of combustion, for although chemists have discovered other substances which resemble it in this respect, they exist in such small quantities, that we will for the present take the liberty of ignoring their existence altogether.

Now, all the combustible substances have an extraordinary liking for oxygen, and it is by their uniting with it that they burn, and, when burned, form new substances. Thus, when hydrogen gas is burned it forms steam or water; water, therefore, is a compound of hydrogen and oxygen. When charcoal is burned it forms carbonic acid gas; so that carbonic acid gas is a compound of carbon (charcoal) and oxygen. The metal calcium when burned forms lime; so that lime is a compound of calcium and oxygen. The metal aluminium when burned forms alumina (clay); so that alumina is a compound of aluminium and oxygen. We might go over all the substances on earth in this way—the rocks, the earths, the sands, the clays, the very water of the ocean: everything that will

not burn is something which has already been burned—something compounded with oxygen.

The popular reader will perhaps be surprised to hear of metals being combustible; and he will probably ask, why do not the iron grates take fire when coals are kindled in them? The answer will be more easily understood when we call to mind that the more solid any substance is, the more heat is required to set it on fire. Thus a piece of coal or coke requires greater heat to kindle it than a piece of wood, and yet the combustion is as perfect in the one as in the other. So it is with the metals, and *quasi* metals,—they require a greater heat to kindle them, but when they are kindled they burn as perfectly, or even more perfectly, than wood or coal. Some of them, such as potassium, are so highly combustible that they will rob even water of the oxygen contained in it, and set the hydrogen free.

We are very apt to imagine that when a thing is burned, it is destroyed and exists no longer. Nothing can be more false; it is not destroyed, it has only become transformed into another kind of substance by uniting with oxygen. If the compound substance thus formed be a gaseous substance, it flies away unseen, and it is this that has given rise to the notion that nothing remains. This is the case with such a material as wood—the wood is composed chiefly of hydrogen gas and carbon. The hydrogen gas when it is burned, forms water or steam, and disappears; the carbon, in like manner, forms carbonic acid, and it also is a colourless gas, and disappears—the substance of the wood, therefore, appears to be destroyed by burning; but let us take any substance that produces a solid when combined with oxygen, and then, instead of disappearing, it turns larger and heavier than it was at

first, because it has converted the oxygen into a solid also. Take a piece of zinc, for example, melt it in an iron ladle, and keep it in a hot fire till it is more than red hot. In a little while combustion takes place, and white fumes are thrown off in great quantities till all the zinc has been burned. If this white powder be collected and weighed, it will be found that it is heavier than the metallic zinc was at the beginning—it is a compound of zinc and oxygen—all the zinc is still there, and it is the oxygen that makes it heavier.*

We must next observe that almost all the combustible substances, especially the metals, are solid when they are cold; it is only when they are heated that they become liquid, or, if the temperature be high enough, they boil or evaporate, and are thus converted into inflammable gas.

Here, then, is a wonderful history through which our world has passed—the rocks and the earths, the sands and the clays, the very ocean itself, are, every one of them, compounds of oxygen and something else, the results or products of a long continued and universal conflagration.

According to this view of the case, nearly one-third of the whole of the earth's substance is oxygen gas, and the other two-thirds a collection of combustible solids which have been burned in it and united with it; and the question now arises, in what state did these substances exist? As regards the oxygen, the question is very easily answered,—it could exist in no other state than gas; and if so, it must have occupied three or four thousand times the bulk which it occupies at present, counting it as of the ordinary density of the air we breathe. Think of a world only two-

* See Appendix A.

thirds of the size of the present, all composed of combustible materials, with an atmosphere of almost pure oxygen round it, four thousand times greater than itself.

But the air that we breathe is compressed into its present small bulk by the weight of the air above, which produces a force equal to fifteen pounds upon every square inch. If it were relieved of this pressure, it would swell out to an enormous extent by the force of its own elasticity. And how is it that the air above presses downwards so? It is the powerful attraction which the earth exerts upon it. If the earth were only two-thirds of its present weight, it would have only two-thirds of its present attraction, and therefore the oxygen gas, upon this supposition, could not have had the density of the air we breathe, and its bulk would be so much the greater.

But there is another principle which must be taken into consideration: the attraction is diminished, not only by the smallness of the world, but by the greatness of the distance. If the earth attracts the atmosphere at the distance of twenty miles with a force of one pound; at a distance of forty miles the attraction will be only a quarter of a pound, because the force diminishes according to the square of the distance. The expansion of the gas, therefore, would increase the distance, and this in turn would lessen the pressure, until this atmosphere of oxygen gas would reach even to the orbit of the moon.

But why should we suppose that all the combustible materials of the earth were collected in one heap originally? If expansion be the natural inclination of a gaseous substance, attraction and aggregation is the natural tendency of solid substances: and, if the one-third of the earth's materials extended far beyond the orbit of the moon (and they must have done so), it is by no means an

unnatural idea, to suppose that the solid materials were scattered throughout the same amount of space.

This, again, would diminish the density of the oxygen; for if the attraction of the solid matter were distributed so widely, there would scarcely be any pressure at all, and the oxygen atmosphere would be so thin and so diffused, that our imagination could scarcely realise its exceeding rarity. We have only to scatter the solid combustible particles still more widely through this extended atmosphere, and then the solution of the problem is complete.*

Before proceeding to apply these principles of celestial chemistry, we must prepare for it by the following chapter, upon Meteoric Stones and Shooting Stars.

* See Appendix A.

CHAPTER VII.

METEORIC STONES AND SHOOTING STARS.

ALTHOUGH meteoric stones and shooting stars are not, properly speaking, the same, yet they may be regarded as belonging to the same grand class of "*planetary dust*," which appears to exist in great abundance throughout the solar system.

"Meteoric stones," says Dr Dick, "or what are generally called aerolites, are stones which sometimes fall from the upper regions of the atmosphere upon the earth. The substance of which they are composed is, for the most part, metallic; but the ore of which they consist is not to be found in the same constituent proportions in any terrestrial substances. Their fall is generally preceded by a luminous appearance, a hissing noise, and a loud explosion; and when found immediately after their descent, they are always hot. Their size differs from small fragments of inconsiderable weight to the most ponderous masses. Some of the larger portions of these stones have been found to weigh from 300 pounds to several tons; and they have often descended to the earth with a force sufficient to bury them several feet under the soil."*

Mrs Somerville mentions, that one which passed within twenty-five miles of the earth was estimated to weigh 600,000 tons, and to move with a velocity of about

* Dick's Christian Philosopher, vol. i. p. 288, *note*.

twenty miles in a second. It is well that a fragment only of this dangerous wanderer reached the earth.

SHOOTING STARS.

Every person must be familiar with those beautiful meteors called falling stars, or shooting stars, which are so frequently seen at night when the sky is clear. Their general appearance is that of a bright star suddenly sweeping downwards and becoming extinguished before reaching the earth. This, however, is sometimes varied; a train of light is occasionally left in the track which it has pursued, and sometimes an explosion takes place and scatters the fragments in different directions. At one time it was supposed that these meteors were generated in the atmosphere, but all are now agreed that they do not belong to the earth or its atmosphere, but are produced by the incandescence of combustible substances which exist throughout the fields of space, and which are attracted towards the earth when it approaches them in its passage round the sun.

It has also been observed, as a peculiarity of the shooting stars, that at two particular points of the earth's orbit their fall is much more plentiful than at any other. These points are traversed by the earth on the 13th of November, and the 10th of August.

On the 13th of November 1833, the shower of meteors was so brilliant as to surpass anything recorded either before or since. Dr Olmstead, who witnessed that splendid phenomenon, thus describes it, as it appeared a little before daybreak, "Let the reader imagine then (he says), a constant succession of fire-balls, resembling sky-rockets, radiating in all directions from a point in the heavens a few degrees south-east of the zenith, and following the

arch of the sky towards the horizon. They commenced their progress at different distances from the radiating point. The balls, as they travelled down the vault, usually left after them a vivid streak of light, and just before they disappeared, exploded, or suddenly resolved themselves into smoke. No report of any kind was observed, although we listened attentively.

"Besides the foregoing distinct concretions, or individual bodies, the atmosphere exhibited phosphoric lines, following in the train of minute points, that shot off in the greatest abundance in a north-westerly direction. They appeared to be much nearer the spectator than the fire-balls. The light of their trains also was of a paler hue, not unlike that produced by writing with a stick of phosphorus on the walls of a dark room.

"From these two varieties we were presented with meteors of various sizes and degrees of splendour; some were mere points, while others were larger than Jupiter or Venus; and one seen by a credible witness at an earlier hour, was judged to be nearly as large as the moon. The flashes of light, though less intense than lightning, were so bright as to awaken people in their beds. One ball that shot off in the north-west direction, and exploded a little northward of the star Capella, left, just behind the place of explosion, a phosphorescent train of peculiar beauty. This train was, at first, nearly straight, but it shortly began to contract in length, to dilate in breadth, and to assume the figure of a serpent drawing itself up, until it appeared like a small luminous cloud or vapour. This cloud was borne eastward—by the wind, as was supposed, which was blowing gently in that direction—opposite to the direction in which the meteor itself had moved, remaining in sight several minutes."

Dr Olmstead then proceeds to collate the various facts as they were observed by different parties. The following are the most important :—

1. The meteors had their origin beyond the limits of our atmosphere, and could not be less than two thousand miles distant.

2. They fell in straight and parallel lines from a point in the heavens which followed the motion of the stars, and the elevation of their fall was westward, being contrary to the earth's motion in its orbit—the earth's orbital motion being nineteen miles per second.

3. Their velocity was not less, and sometimes much greater, than fourteen miles per second.

4. They consisted of combustible matter, and took fire and were consumed in traversing the atmosphere.

5. Some of the larger meteors must have been bodies of great size. Dr Olmstead calculates that one *must* have been more than forty-eight feet in diameter, perhaps not less than one mile—most likely, he thinks, about a thousand feet.

6. The commencement of their combustion took place sometimes eighty miles above the earth, and their extinction sometimes took place thirty miles high.

7. They were composed of light and transparent materials, else they would have forced their way to the earth, and done great damage, whereas no trace of them was found, notwithstanding their enormous numbers.

8. A similar shower took place on the 12th Nov. 1799; also on the same day in 1830, 1831, and 1832. It reached its maximum in 1833, and continued on the same day each year afterwards, gradually decreasing, until the year 1839, when it ceased altogether.

In the absence of any deposit from the combustion of these meteoric substances, we cannot tell positively the elements of which they were composed: all that we are sure of is, that whatever they are, they belong to the class of combustible substances, else they would not take fire by uniting with the oxygen of the atmosphere.

Of the composition of the meteoric stones we can speak much more certainly. Admiral Smyth * says:—

“Experiment shews that we ought to make two principal and essential divisions in their mineral character, by considering meteoric iron apart from meteorolites. The first is commonly covered with a smooth coating of brown oxide: it is malleable, from $6\frac{1}{2}$ to $7\frac{1}{2}$ in specific gravity, and contains from $3\frac{1}{2}$ to 10 per cent. nickel, with occasionally a small admixture of chrome and olivine. But meteorolites are found to contain such a multitude of substances, that, taking all the specimens together, one-third of the known chemical elements may be stated to have been detected in them. The usual constituent parts are—chromate of iron, sulphuret of iron, oxide of tin, various silicates of magnesia, potassa, and alumina; magnetic iron and native iron, with traces of carbon, phosphorus, magnesium, manganese, nickel, cobalt, tin, and copper. Their general specific gravity varies from 3.4 to 3.7; but they are occasionally found of a scoriaceous structure, and thus exhibit still more strongly the effects of fire. The more compact ones bear a strong resemblance to each other in their dark and equal colour, smooth exterior, and principal components.”

With these facts accumulated in our hands, the question now presents itself, What light does this throw on

* Cycle of Celestial Objects, vol. i. p. 163.

the chemistry of the solar system ? And the first response must suggest a great general principle which pervades the whole—that the materials of the shooting stars and meteoric stones are all highly combustible.

Still, however, there is a marked division. The shooting stars and the meteoric stones differ in very important particulars—first, in the more inflammable and less condensed substance of the shooting stars ; and, second, in their periodicity being observable, which is not the case with meteoric stones. Whether this latter circumstance be accidental or not, it is important to know that there is a periodicity of some kind in the shooting stars, which may be useful at some future day in supplying an element of investigation. May it not suggest that, while the materials which produce the shooting stars belong to this zone of the solar system, the meteoric stones, being possessed of no observable periodicity, are stray wanderers from the exterior of our orbit ?

But we must now examine the reason why they assume a luminous appearance when they enter our atmosphere ; and we shall first direct attention to the meteoric stones, which are always hot when they fall.

Belonging to the regions beyond our atmosphere, they are attracted to the earth as it approaches them ; and as the medium through which they fall is at first extremely rare, their velocity must be even greater than that of the shooting stars, which are not nearly so compact or so heavy, and the velocity of the latter exceeds 14 miles per second.

Two explanations have been offered to account for the kindling of these meteorolites. One is, the condensation of the atmosphere in front of the stone ; the other is, the heat

evolved by friction in its passage through the atmosphere at this high velocity. Both of these causes would operate in producing the effect observed ; but there is a third, which is more powerful than either, although it is not so well known or so well understood. It is the attraction produced by motion, which increases according to the velocity, or perhaps in even a higher ratio. When a bullet is shot from a musket, or a piece of ordnance, it is immediately surrounded with a dense atmosphere, which travels with it, and is capable of producing a blow sufficient to kill a man without his actually coming in contact with the ball itself. This atmosphere is not the mere sweepings of the air in front, but it is a closely-bound envelope, attracted to the ball with a power proportioned to the velocity of its passage.

A very simple method of exhibiting this attractive power of motion may be obtained by inserting the end of a small pipe, such as the barrel of a quill, into the centre of a card, so that the opening of the pipe does not project beyond the surface. If we blow through this pipe against any flat surface, such as a piece of paper, instead of driving it away, it will attract it towards the card in which the pipe is inserted, and hold it there the more firmly and the more closely the more violently that we blow. This singular effect is produced by the attraction of motion, which operates very powerfully whenever the velocity is very great. A meteoric stone, therefore, falling through the atmosphere at the rate of 14 miles every second would attract towards it, in its passage, not only the atmosphere in front, but all round, even to a considerable distance, and produce an envelope of air of great density, probably a thousand times more dense than it was before being attracted. According to the well-known law of condensa-

tion, the latent heat would be developed to an enormous extent, and the meteoric stone would be instantaneously surrounded with an atmospheric furnace.

The same principle would apply to the shooting stars, but being spongy, or even in the form of delicate flakes of combustible materials, they would be not only heated but consumed, just as thin paper would easily take fire when a piece of pasteboard would not be scorched. The products of their combustion would depend on the matter of which they are composed. The circumstance of their never reaching the ground, and sometimes being dissipated in vapour, suggests that probably they were not solid metals like the meteoric stones. At all events, they must have been either dissipated in dust if they were metallic, or melted in air, according to the nature of their materials.

It would appear that, although all space seems sprinkled with these substances, the great store-house of meteoric matter lies within the orbit of our planet, and in the greatest abundance in the immediate vicinity of the sun. Those who have visited tropical countries must have witnessed that faint but beautiful glow of light which appears to rise high in the atmosphere as an immense cone, both in the morning and evening twilight. It is called the zodiacal light, and although involved in considerable uncertainty, it is generally understood to indicate a vast region of meteoric matter revolving round the sun.

There is, therefore, a great probability that in the solar system there exists as much meteoric matter, still floating within its bounds, as would be sufficient to make other bodies, each of them as large as the sun.

CHAPTER VIII.

THE GEOLOGY OF THE SUN.

WE are now prepared to examine how far our knowledge of the composition of the earth and its meteorolites will serve to explain the phenomena of the sun ; and it at once appears as if the whole scene, which we have been describing, were presented in reality before our eyes. In the corona that surrounds the sun we behold the atmosphere of oxygen, which is necessary for combustion ; and in the zodiacal light we see the store of fuel which is to sustain it, and with which the oxygen is to be combined.

For the sake of the unscientific reader, the explanation will be given in the form of answers to questions which might present themselves as difficulties.

1. *Why should the atmosphere round the sun be composed of oxygen ?*

There are two reasons why we suppose that the atmosphere around the sun is composed of oxygen. *First*, because we find that our own earth was once surrounded by an atmosphere of almost pure oxygen, which occupied a space in the heavens so large as to form a considerable portion of the solar system. If we suppose the other planets to have been formed in the same manner, we must conclude that the general atmosphere of the solar system is oxygen. The *second* reason is, that as the sun appears to shine by the combustion of meteoric matter, we could not

suppose that any other atmosphere except oxygen would support its combustion.

2. If the light and heat of the sun be produced by the fall of meteoric matter to its surface, why does not the whole fall at once ?

We find throughout the entire universe an apparent law of rotation or revolution. When two bodies gravitate towards each other, they are always found to revolve round one another. The earth and the planets revolve round the sun, the moons revolve round the planets, and the planets and the sun itself rotate on their own axes. Even the fixed stars (as they are called), when they are double, revolve round one another. We have no reason to suppose, therefore, that the meteoric materials of our system are an exception to the general rule. We have only to suppose that they revolve round the sun as all the other bodies do, and then we have a reason why they do not at once fall to its surface.

3. If the meteoric materials revolve round the sun, why should they ever fall to its surface ?

If there be an atmosphere existing throughout the solar system, more especially near the sun, all the bodies that move round it must meet with some resistance in their course. As regards the planets, this resistance may be so slight as to produce no visible effect, because they are large and heavy ; but it is not so with the meteorolites ; they present so large a surface, in proportion to their weight, that even a very thin atmosphere would retard their progress, and make them sink towards the sun. It is indeed probable that as their orbits decrease they will become less numerous, because many will unite into one ;

and as it is likely that the heat of the sun will melt them into a globular mass, they will on that account experience less resistance ; but, on the other hand, as the atmosphere will always be becoming more dense, the nearer they approach the central body, they will encounter more and more resistance, until at last they plunge into its body.

4. *If the meteorolites are for some time revolving round the sun, why do they not take fire from its heat before they fall to its surface ?*

The heat of the sun is so great that these meteorolites will be melted while they are yet millions of miles away. We shall suppose one to be a million of tons in weight, another a thousand tons, and a third, one ton. We shall also suppose that they are made of the usual materials of meteoric stones, say iron and nickel. When they have approached the sun so as to be melted by its heat, the pure metal, being the heaviest, will sink to the centre of the mass, and the oxides and other materials will rise to the surface, and float upon it, so as to cover the metal and protect it from the atmosphere. But we must recollect that the sun's rays have the power of *deoxidising*, and therefore when the oxides are exposed to the sun's rays they will be deoxidised, the oxygen will be thrown off, and the pure metal will flow downwards to the centre, leaving fresh oxides on the surface to be decomposed. Instead, therefore, of the meteoric matter being burned by the sun's rays, they would be *unburned* and restored to their combustible state. We have an illustration of this fact in common fires exposed to the sun ; instead of the heat of the sun helping the coal to burn, the deoxidising power of the sun's rays prevents it from burning.

5. How then do they burn when they fall to the sun ?

The heat of the sun is sufficient not only to melt, but to boil the metals and other materials of the meteoric stones,—that is to say, to convert them into inflammable gas. This does not take place until they have fallen towards the sun's body, and even then, when they are very large, it will take some time before they are all evaporated. The gas which is thus set free forms the interior atmosphere of the sun, which can only burn at the outside where it comes in contact with the oxygen. It is this envelope of flame which we see surrounding the sun's body. On the outside of this flame is the oxygen. In the inside is the inflammable gas, generated by the boiling of the meteoric metals.

We might exhibit a model of this flame by filling a jar with coal gas, and setting fire to it at the mouth. The gas would only burn at the mouth, where it came in contact with the atmospheric air. None of the gas below the flame could burn, until it rose towards the oxygen without.

6. Why should they not boil before they reach the sun ?

The heat generated by meteorolites is caused, not so much by the combustion of the metals, as by their fall (this will be explained in the answer to the next question); the heat therefore cannot be developed till the motion is stopped; and this can scarcely be said to happen till the falling body has entered the denser atmosphere beneath the flame, or, in the case of large meteorolites, even the body of the sun. The absorption of heat by evaporation must render the process comparatively slow, when the meteorolite is large.

7. How could a flame of gas produce such intense heat as comes from the sun ?

We may account for the heat not only by the quantity of gas which is continually consumed, but by the friction which is produced by the fall of the meteorolites. Even with the small forces which we have on earth, we find that we cannot stop any motion without producing heat by friction or percussion. It has been discovered that this is a general law, and that heat may be measured by the amount of force required to produce it, and force can be measured by the quantity of heat which it will produce.* For this reason the descent of meteorolites to the sun must produce an enormous amount of heat, much greater than that produced by the combustion of the gas. Were it not for this, the continual evaporation or boiling of the meteorolites would soon lower the temperature of the sun's body.

8. *How can this great heat produce so much light?*

When hydrogen gas is burned in oxygen an intense heat is produced with very little light: a pale blue flame is all that is seen; and yet the heat is so great that if we place a wire or a little ball of lime within the flame, they become so hot that they dazzle the eye with their splendour. The intense light that is thus produced is that which may most nearly resemble the sun in intensity, and yet it has been found that this lime ball, when placed between the sun and the eye, appears a dark speck upon its surface.

If, then, the gas which is generated from the meteorolites were hydrogen, we would have great heat but little light, unless we had solid matter in the flame to convert the heat into light. The reason why hydrogen gives little or no light when it is burned, is because the product of its

* See Appendix H.

burning is a transparent gas which cannot radiate light. When hydrogen unites with oxygen in burning, it forms water and steam ; but the steam, however hot it may be, cannot shine as a luminous substance ; it will still be transparent. But if the metal calcium were converted into vapour, although it would be itself transparent, yet when it united with oxygen in burning, it would produce for itself lime balls or lime powder, for lime is the oxide of calcium ; and on that account a brilliant light, like that of the lime ball in the oxy-hydrogen blowpipe, would be the result.

It is evident, therefore, that the metallic gas produced from the meteorolites must give an intense light on account of the earthy matter which is produced by its oxidation, and which converts the heat into light. It is also evident that the greater the heat of the gas before burning, the greater will be the brilliancy of the light ; because the earthy powder that is produced by the combustion of the gas will receive the heat of the combustion, in addition to the heat of the gas before combustion. For this reason, the light given out by this earthy powder generated by the gas will as far exceed in brilliancy the light of the lime ball, as the gas of the sun exceeds in heat the gas which we use in our experiments (reckoning the heat of each *before* burning). The heat produced by combustion bears only a small proportion to that produced by the friction, but the heat of both will be communicated to the earthy matter at the instant of its formation, and the consequence will be a corresponding intensity of light.

9. *If the surface of the sun which we see be only the exterior of its atmosphere, and not the body of the sun, what is the size of the sun itself ?*

The surface of the sun, as we see it, is not the solid or liquid body of the sun, and gives us no information regarding its real size. Had we no other means of judging but by the appearance which is presented to the eye, we could not know whether the sun had any body at all. It might be nothing more than a great balloon,—or, if there were a body, it might be no larger than a mere speck in the centre,—or, at most, any size less than its apparent diameter. We must obtain our information on this point by other means. The only means we possess for ascertaining how large the body of the sun really is, and how much of its apparent bulk is occupied by its atmosphere, is its weight as compared with that of the earth. Now we know that the weight of the sun is somewhere about one-fourth of what it would be if it were all solid like the earth, and of the same specific gravity. It has, therefore, been supposed that the density of the sun's body is no greater than that of water. It is true that the intense heat of the sun, by expanding its substance, would tend to keep it light, but this would be more than counterbalanced by the enormous pressure towards its centre. Supposing, then, that its specific gravity were no greater than that of the earth, the true body of the sun could not be more than about three-fifths of its *apparent* diameter,*—that is to say, it could not be more than 530,000 miles, which would leave at least 175,000 miles for the depth of its interior atmosphere. The real body of the sun, therefore,

* The weight of the sun is calculated by the velocities of the planets, on the supposition that the attracting force is only in the sun itself; but if there be as much meteoric matter revolving round the sun as would make it twice as large, in that case its specific gravity would be much less than that of water, and the real body of the sun smaller than we have stated. Probably the real diameter of the sun is not more than 400,000 miles.

is much smaller and much denser than is supposed. It lies at an immense distance below the flame,—a mass of molten lava, with a temperature, not only far above white heat, but higher than any which we are able to produce on earth.

The diameter of the sun's disc is probably variable, and ought to be periodically measured.

10. *Would not the smoke and other products of the combustion rise to form a dense cloud above the flame, and at length extinguish it by shutting out the external air?*

In the sun's combustion there can be no smoke, nor any residuum, such as half consumed fuel. Smoke is produced by the want of heat or want of oxygen; for where there is sufficient heat and sufficient oxygen the smoke is always consumed. But in the sun there is no want of heat, and round it there is no want of oxygen, therefore there can be no smoke. At the same time there is reason to believe that there are products of combustion of a gaseous nature thrown upwards, that tend to interfere with the easy supply of oxygen above. What that product may be, is an interesting question for chemists to take up. Being a product of combustion *it must be an oxide*,—its being capable of extinguishing the flame, as we shall afterwards shew it does when it accumulates, proves that *it must be gaseous in its form*,—its determined inclination downwards, whenever it is able to force a passage through the flame, proves that *it is a heavy gas*,—while *its decided opacity* is a fourth quality by which they may discover what it really is. It may be an oxide, which we never see, except in a solid form, at our low temperature.

It is needless to discuss the question why it does not extinguish the flame, because its constant agitation when

it is in small quantities is a sufficient explanation of the fact as regards the general surface of the flame ; but as we find that it does extinguish the flame when it accumulates, and takes that opportunity of making its escape downwards, it is evident that this is a matter which regulates itself. It cannot extinguish the flame until it accumulates to a certain amount. What else would we expect ? When it has accumulated to that extent, it extinguishes the flame and makes its escape. How could it be otherwise ?

11. *How may the spots on the sun be accounted for by this theory ?*

The existence of an opaque cloud or envelope round the surface of flame may be considered as well ascertained.* That it is in a state of constant agitation, and is continually varying in depth, is also evident from the mottled appearance that the outer portions of the sun's disc present. If this cloudy envelope be one of the products of combustion, as we have no reason to doubt, it must always be accumulating, unless there be some means of discharge.

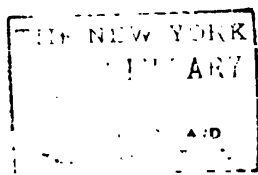
The appearance of the spots, and their radiated character, prove that they are caused by a *descending* current, not by an *ascending*. Had they been caused by an ascending current, there would have been concentric circles of light all around, like those produced by a stone thrown into a lake ; whereas, if the current descended, and was gathered from above to the place where it went down, we should expect radiating lines, produced by the stream cutting its channels, like mountain torrents uniting in a single stream.

A third fact seems no less evident,—that, where this

* See Appendix I.



SECTION OF THE SUN.



current sets in, the flame is interrupted or extinguished, and we are able to see an interior atmosphere, highly incandescent, but not so luminous as the flame itself.

It needs little ingenuity to combine these ascertained facts into an explanation. The exterior atmosphere, although not sufficient to prevent combustion when spread thinly over the flame, is capable of extinguishing it when in a torrent it breaks through to force a passage downwards. When the flame is extinguished, we get a view of the interior atmosphere; and this, though not so bright as the flame itself, is still highly incandescent. What is it we then see? The metallic gas which produces the flame, when it unites with the oxygen, forms an earthy precipitate, the incandescence of which, at the moment of combustion, causes the intense light which illuminates the planets around. Now, although this earthy product must give off much of its heat for a few seconds after its formation; when it descends beneath the flame in a thin fiery shower, it must still retain much of its heat and light, because there is no place to which it can send it without receiving as much in return. It is this fiery precipitate then, that we see descending in the interior, as soon as the envelope of flame is withdrawn. That is to say, we see the earthy precipitate that fell some time before from the flame that is now extinguished; and it is still falling, and will continue to fall, in the same direction for years downwards when the spot which uncovered it is forgotten.

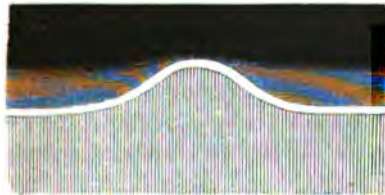
This explains the umbra, but it does not explain the spot itself. The spot has been supposed to be a second opening, through which we obtain a view of the body of the sun, which is therefore supposed to be dark. But *how can* it be dark according to this hypothesis, or indeed

according to any hypothesis? If there be an incandescent precipitate falling from the flame, and not much darker than the flame itself, what is there to cool it in its descent? We expect that the body of the sun should be as incandescent as the luminous precipitate of which it is composed, because it cannot be cooler inside than it is out. The dark spot, therefore, cannot be the body of the sun, but the descending cloud; or, it may be, an opaque atmosphere, composed of such discharges.*

It is interesting to observe how much we may learn from an apparently unimportant observation, which could not be explained at the time it was made. For example, it has been observed, that, generally before a dark spot breaks out, a bright spot precedes it. Now, let us mark what this indicates: a bright spot can only be caused, either by the removal of the dark cloud above, or by increased density of conflagration. If it be by the latter, it must be produced either by a jet of metallic gas being projected upwards into the oxygen, or a jet of oxygen being projected downwards into the metallic gas; or, if it be caused by the removal of the dark cloud, it must be by the rising up of the flame, like a mountain rising above the earth's atmosphere. Whichever of these may be found, on more careful examination, to be the cause, the descent of meteorolites of a large size must in some way be connected with it: either the meteorolite will carry down with it a dense envelope of oxygen, as our own meteorolites

* That the solar spots are caused by *descending* and not by *ascending* currents, seems that which is most consistent with all the phenomena. With this as a starting point, the other suggestions must be examined in the light of actual observation, and modified accordingly. It may probably be found, that the appearance of the spots at a distance from the centre indicate the existence of an opaque inferior atmosphere.

do, and this would produce increased conflagrations by descent ; or the violent ebullition of the meteorolite might project the metallic gas upwards into the oxygen ; or a more gentle but more extensive heaving of the surface of flame might be produced by the same cause, without supposing the quantity of combustion to be increased. Upon this last supposition, and it appears to be the true one, the outer cloud would be thrown off to the sides like the back-flow of the sea caused by the rising of a continent,



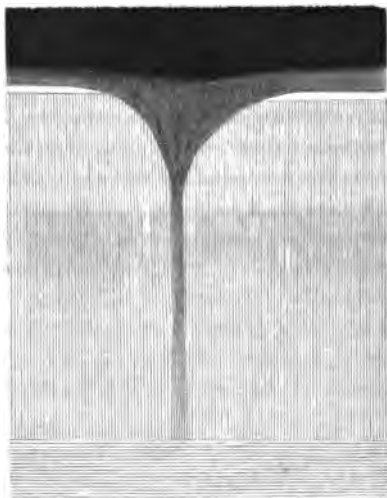
Oxygen.
Dark cloud.
Flame.
Descending
precipitate.

and then we have at once an explanation of the subsequent breaking out of spots. When the flame raised by the ebullition fell to its former level, the outer cloud would return, and, by its flow toward the vacancy, would not only restore the former depth, which was its natural level,



but the impetus of the current would continue until it rose as much higher as it was previously lower. The pressure would thus be concentrated on one spot and the flame depressed ; the cloud would then burst through

the flame and discharge itself into the gulf below, and the spot would be formed.



The circumstance that the spots are confined to the equatorial regions of the sun, where the large meteorolites alone would fall, favours this explanation.

It is not necessary to suppose that the meteorolite ever reaches the body of the sun: according to its smallness, so would be the rapidity of its sublimation; and, therefore, shortly after it had gone below the flaming surface, it would begin to evaporate.

12. *How are the rose-coloured flames which are seen during an eclipse of the sun to be accounted for?*

These excrescences * were at one time supposed to be

* See pages 46, 47.

connected with the spots on the sun, but more careful observation has proved that they are not. The spots are confined to the equatorial regions of the sun ; the rose-coloured projections are found in no particular part. To understand their cause, we must consider what sort of place they are found in. Making every allowance for the exaggeration of height produced by optical illusion, we cannot estimate their extreme height above the surface of the flame at less than a thousand miles—it may be very much more. Now this is exactly the region in which the surrounding atmosphere has its greatest density, and forms as it were a great atmospheric ocean, having the surface of the flame for its base. The dark cloud that rises from the conflagration below, lies heavily as a well-marked lower stratum at the bottom, and obscures the sun by intercepting its rays. It is difficult to imagine the violence of the tempests, the currents, and the whirlpools that are continually agitating this great ocean of air, kept tossing on the surface of the sun. If the heat of the sun is able to produce the tempests of our own atmosphere at this distance, by heating the surface of the earth, and causing currents upwards where the soil is warmed, and downwards where it has been cooled, what will be the effect when a dense ocean of air is lying upon a bottom of living flame ? Still more, what will be the effect when its action is intensified by the opaque cloud at the bottom, intercepting the heat which would otherwise escape through a transparent atmosphere ? The effect will be exactly as if we were to put a boiler of cold water on a hot fire ; the heated water below and the cold water above will produce violent currents upwards and downwards, in a vain attempt to equalise the temperature.

These eddies and currents would never have been

visible to us, were it not for the lower stratum of opaque cloud, which, like a sediment in water or dust in the atmosphere, shews how the wind blows. The pure oxygen would never have shewn us its movements, however violent, because of its uniform transparency; but when the opaque cloud is borne upwards, like the contents of a barn-yard in a whirlwind, its own incandescence, added to its reflection of the light of the sun underneath, will produce all the appearances of pyramids and tongues of rose-coloured flame, which are seen during the total eclipses of the sun.

13. *What depth of deposit is added every year to the sun's surface? and what is the probable age of the sun on this theory?*

Supposing the real diameter of the sun to be 530,000 miles, one-half of this would represent the deposit which has accumulated from the centre upwards; that is to say, 265,000 miles is the depth of the materials which have been deposited as the product of the sun's combustion.

It has been calculated that the fall of one pound of meteorolites every five hours on every square foot would be sufficient to produce the light and heat of the sun, supposing the meteorolites to fall from an infinite distance. This, at five times the density of water, would give six feet every year; but as the meteorolites do not fall from an infinite distance we may multiply the six by ten. From this, however, we must deduct, say one-twelfth part, for the light and heat produced by the oxidation or combustion of the meteorolites, which would reduce the deposit to fifty-five feet in a year.

But as each meteorolite when burned adds nearly a third of its own weight of oxygen to the mass, this addition

gives us a ratio of nearly seventy-two feet for a year's deposit, or one mile in seventy-three years four months. This would give nearly 65,000,000 of years as the age of the sun.

In making this calculation, it is not to be supposed that any one of the elements is correct. It is offered only as a specimen of the mode in which a more accurate approximation may be obtained. Every correction or discovery will be a step nearer to the truth.

CHAPTER IX.

HOW STARS MAY BE KINDLED.

OUR knowledge of the materials of the universe is confined almost entirely to heavy bodies, the substance of which is in a state of extreme condensation. So far as we know, there is nothing in nature that greatly exceeds the density of the metals daily passing through our hands; whereas the lighter substances of nature, which constitute by far the greater part of creation, are so very light and unsubstantial, that we have nothing on earth that can be at all compared to them. Hydrogen gas is the lightest substance we know of in our terrestrial chemistry, but even it is so heavy, compared with the atmosphere of the solar system, that it is as lead weighed against air. Even this solar system atmosphere is not very light after all, compared with the atmosphere of the universe. The ether which receives and transmits the vibrations of light has no specific gravity at all.

The ether of the universe is now something more than the mere fancy of the philosopher. Guided by our experience in the science of sound, it was long since suspected that light was not a substance but a force, and as sound was conveyed by the vibrations of air, so it was suspected that light was conveyed by the vibrations of another substance supposed to exist, which has received the name of ether. The nature of the present inquiry

does not permit us to enter into the question; it is sufficient to say, that all the tests which have been applied to this theory have been successful.

Supposing this substance to exist, it would be exceedingly difficult either to give or to receive an adequate conception of its nature. It is so compact that it exists in every thousandth, or rather in every millionth part of an inch. It is so transparent that no amount or depth of it can produce reflection; and yet it is altogether imponderable, so that it maintains an equal density throughout creation, else it would not be a perfect medium for the radiation of light.

The reason why we cannot conceive how such a substance can exist, is not because it is less intelligible in its properties than air, or water, or gold, but because all our experience and all our manipulations have been hitherto confined to substances so inexpressibly different.

An intermediate kind of atmosphere is that which pervades the solar system. It differs from the ether of the universe in being sensibly subject to the influence of gravitation—in being impenetrable—that is to say, offering resistance to the motion of material bodies, (which ether, if it exists, does not do,) and in being capable of refracting or reflecting light. Its existence is proved not merely by such a phenomenon as the solar corona, but by the retardation which it produces in the flight of comets. It has been calculated that the quantity of this atmosphere, equal to her own bulk, which the earth displaces, weighs about 250 pounds, and that a thousand cubic miles of this atmosphere weigh only seven grains.

Our atmosphere, therefore, must be considered a densely compacted substance, which, although it may appear light to us, is, compared with other atmospheres, exceedingly

heavy, and the materials of our earth belong to a class of substances of extreme density.

Supposing, then, that the materials of the celestial bodies existed in their uncombined state, we should have an exceedingly rare and expanded atmosphere of oxygen, with particles of combustible matter in a solid state, at immense distances from each other. These materials would consist probably of silicon, calcium, aluminium, iron, potassium, sulphur, carbon, phosphorus, and such like,—all possessed of a highly *positive* chemical polarity, that is to say, highly combustible; the atmosphere of oxygen in which they were scattered being of a highly *negative* chemical polarity, that is, a powerful supporter of combustion.

It has been already shewn that the gaseous atmosphere would, by its elasticity, incline to diffuse itself equally around, while the solid substances contained in it would, on the contrary, incline to congregate into separate clusters, and attract the atmosphere more densely around them, because it would gravitate towards these centres.

When the accumulation of solid materials had reached a certain amount, the falling in of other centres towards its mass would be continually evolving heat by friction and percussion. The density of the atmosphere attracted to it would supply sufficient oxygen to inflame any phosphorus or potassium which might be contained in it, and when the combustion had once begun, the whole mass would take fire. The oxides formed would become a nucleus in the centre, while the conversion of the oxygen into a solid would add to the weight of the new-born star. An increased density of atmosphere would take place around it, and its influence would extend millions of miles on every side, causing both the

atmosphere and its contents to gravitate towards it as a centre.

If there be any truth in these views of the probable origin and formation of stars, some interesting questions present themselves for consideration.

1. Might not the whole universe of space have been originally occupied with materials for the formation of stars? or must we suppose that where there are no nebulae, space is entirely empty? Granting that we have no *proof* of the existence of materials where we see no light, is there any proof, or even any reason to suppose that there are none? We are apt to overrate the quantities of matter in the various systems, by underrating their distances, and the areas from which they drew their supplies. For the same reason we underrate the extreme—we might say the *inconceivable* tenuity of the chaos from which they were created. Supposing it to be continuous through the whole of space (having a limit of course), it would not interfere with the visibility of the nebulae, and therefore the transparency of the heavens is no proof of their being empty.

2. May there not, therefore, be materials for millions of millions more of nebulae than at present exist, which have not yet begun to be kindled? and would not such a hypothesis as this provide an explanation of the grotesque forms which they assume? If, according to the present opinion, the nebulae are definite forms created by God, beyond which there is nothing in the immediate neighbourhood, we cannot but wonder that such remarkable patterns should have been chosen. But, if we suppose that the form of a nebula is merely the direction in which the conflagration has already proceeded, and

that there is as much matter outside, upon which the conflagration may proceed in the same direction, the matter is at once explained. The forms of the nebulae, therefore, may yet be traced to the operation of law, instead of being attributed to the result of choice in the selection or origination of particular designs.

3. May it not be that there are millions of extinct suns scattered throughout space, each with dead planetary systems still revolving around them? and may there not be even millions of extinct nebulae, which, ages beyond conception, anterior to any period that geologist or astronomer have ever yet dreamed of, were once the abodes of light and life?

CHAPTER X.

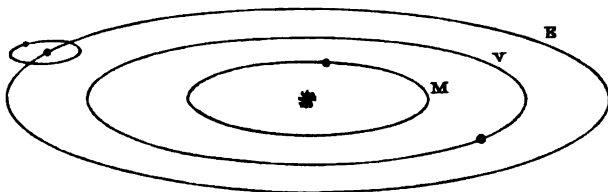
THE PLANETS.

WHAT is called the solar system is composed of the central luminary, the sun, with a number of smaller worlds called planets revolving at different distances around it. To these must be added a host of comets, which travel in every direction, sweeping round the sun with great velocity, and then flying off, some of them to amazing distances, and spending in their journey, in some cases, hundreds of years before their return.

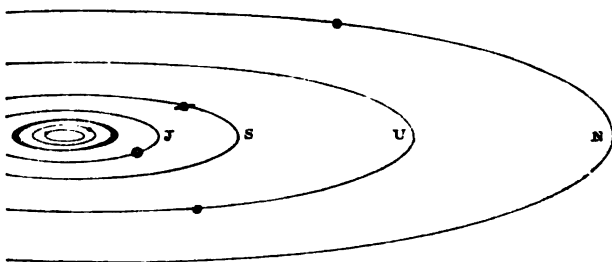
Attempts have been made to construct models of the planetary system, but though they may succeed in shewing the comparative distances from the sun, or the comparative size of the bodies, it is almost impossible to combine the two, so as to shew the sizes of the planets on the same scale as their distances. For example, a model in which the orbit of Neptune is represented by a circle of 550 feet in diameter (and this is large enough for any model) would represent the diameter of our own world as somewhat less than the hundredth part of an inch. And yet such models or pictures are really the best means of enabling us to form just conceptions of the originals, even though we should be under the necessity of adopting more than one scale, so as to exhibit both the larger and the smaller portions of the system.

The following diagram shews the orbits of the inferior

planets,—that is, Venus and Mercury,—which revolve nearer to the sun than our earth. The outer orbit is that of the earth with its moon, the middle orbit is that of Venus, and the innermost orbit is that of Mercury.



The following is a view of the exterior, or, as they are called, the superior planets,—that is those whose orbits are further away from the sun than our own. The furthest orbit is that of Neptune, the next Uranus, the next Saturn, the next Jupiter, the next the multiple system of the Asteroids, the next is Mars, and the nearest to the sun is the earth. Of course Venus and Mars are nearer still, but the scale is too small to shew them.



Let us first imagine the proportions of the earth and the moon. The earth, which is a globe of nearly 8000 miles in diameter, may be represented by a very small marble, half an inch in diameter; and the moon, in the

form of a little bead one-eighth of an inch, will revolve around it at the distance of fifteen inches. Upon the same scale the sun would be represented by a ball of fire four feet and a half in diameter, with the earth revolving round it at the distance of 165 yards.

In order to obtain a better idea of relative distance, we shall reduce the scale a little further, making an inch represent twenty millions of miles. In that case the distances of the planets from the sun will be as follows :—

Mercury,	less than 2 inches.
Venus,	less than 3½ inches.
Mars,	less than 5 inches.
Minor planets,	about 12 inches.
Jupiter,	about 2 feet.
Saturn,	about 3 feet 8 inches.
Uranus,	about 7½ feet.
Neptune,	about 11 feet.

Let us now examine the planets one by one.

MERCURY.

Diameter,	3,140 miles.
Distance from the sun,	37,000,000 miles.
Length of day,	24 hours 5 minutes.
Length of year,	87 days 23 hours.

This little planet, which is the nearest to the sun, is remarkable for its great density and the velocity with which it travels in its orbit. It has an atmosphere of considerable depth; and this, added to the difficulty of obtaining favourable views of its surface, in consequence of its nearness to the sun, prevents us from tracing any of its geographical features. Its average temperature is above that of boiling water, its winter hotter than our hottest summer, and its summer hotter than melted lead. We have no reason to believe that this planet is inhabited.

VENUS.

Diameter,	. . . . .	7,700 miles.
Distance from the sun,	. . . . .	68,000,000 miles.
Length of day,	. . . . .	23 hours 21 minutes.
Length of year,	. . . . .	224 days 16 hours.

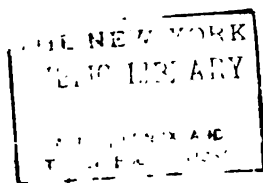
The orbit of Venus lies between that of Mercury and the earth, and is distant from us sometimes only 26,000,000 miles. For this reason Venus appears the brightest star in the heavens, and is known by the names of the morning and the evening star. Its light is of a brilliant white colour, and notwithstanding that it has an atmosphere, though not a very dense one, some slight geographical features have been observed so distinctly as to enable astronomers to discover a rotation upon its axis.

This planet resembles our world, not only in being nearly of the same size, but also in having nearly the same length of day. Its year is between seven and eight months, during which period it has two summers and two winters. Although it is much nearer to the sun than our earth, the intensity of its heat is moderated by the great inclination of its axis, which distributes the sun's rays over a large portion of its surface. It has an atmosphere; and if, as is likely, its atmosphere is less dense than our own, this also would tend to moderate its heat, and yet it would tend also to render the condensation of water on its surface more difficult.

There is some reason to suppose, however, that both animals and vegetables exist in this planet; and probably the day is not far distant when physiologists will be able to describe with tolerable certainty what must be the prevailing types both of vegetation and biology on its surface.



COMPARATIVE SIZES OF THE PLANETS
and their Atmospheres.



THE EARTH.

Diameter,	7,916 miles.
Distance from the sun,	95,000,000 miles.
Length of year,	365 days 6 hours.
Density—water as unity,	5·67.

Our earth, which is next in order, possesses in a greater degree than any other planet the conditions favourable to animal and vegetable life. Its distance from the sun, the quantity as well as quality of its atmosphere, and the inclination of its axis, are so genial, and provide so many advantages, that it would be difficult to say how they might be improved. Our earth is one of a thousand in this respect, and it amounts almost to a direct denial of this fact if we hold that life can be equally luxuriant under every combination of circumstances.

It may be interesting to inquire what appearance the earth must have when viewed from a distance. Our atmosphere is not altogether transparent, either by day or by night. If it were so, the stars would appear to be set in a sky intensely black, and would shine with a brilliancy which we can never witness on earth. On the tops of lofty mountains the traveller is privileged to gaze on something approaching to this; but as he cannot altogether rise above the atmosphere, there must always be some of it intervening. The colour of the air is an azure blue when the light is reflected from it, but of a golden orange when light is transmitted through it. At night, when the sun does not shine upon it, it is very transparent, its colour being only observable as a deep blue brought out by the light of the stars. When lighted up by the moon, the colour brightens, so as to shut out the light of the fainter stars. But in the full light of day it becomes a semi-opaque screen, through which the light of

the stars is rendered almost invisible. Like the atmosphere of a dusty room, its opacity becomes evident only when the sun shines upon it.

As the earth cannot be seen from a distance except when illuminated by the sun, its geographical features can scarcely be visible.* If we are unable to see through the illuminated atmosphere from within, our continents and oceans must be equally invisible from without; and, if the bright blue atmosphere spreads itself as a veil over our planet, so that it alone is visible, the earth must appear one of the most lovely objects in the heavens. Upon the same principle we are not able to see the geographical features of the planet Venus, although its atmosphere is not nearly so dense as ours, and yet the heavens at night, for the same reason, will be more visible there than here. The colour of its atmosphere is probably the same as our own, but the greater light thrown upon its surface, and the comparative thinness of its envelope makes the difference. If on account of the density of our atmosphere, its own bright blue tint alone is visible, then from the surface of the planet Venus, our earth will appear as a bright blue star in the heavens—an object of surpassing beauty. When in opposition, the blue disc of this earth will appear brighter, and very much larger, than the disc of Venus can ever appear to us. Nothing perhaps could convey a better idea of the appearance which it will present, than one of those large blue stars which drop from exploded rockets, and float in beauty for a few moments in the sky.

As seen from the moon, the appearance of the earth will appear still more magnificent, its disc being fourteen times larger than that of the moon as seen from the earth.

* See Appendix K.

It will appear as if a great circular patch had been cut out from our own blue sky, and planted on the black ground of the lunar heavens. The geographical features of the earth will be so covered over with the blue ocean of the atmosphere, that the most expert geographer would fail to recognise in it the object of his studies. Streaks and belts not altogether parallel with the equator, will mark the different climates, and will vary with the seasons, producing distinct but changing patterns of singular beauty.

When viewed from a short distance from the earth, the atmosphere will appear a soft and downy envelope, like a small thick fog shaded off at the edges; but as its depth is only the 200th part of the diameter of the earth, this softness of edging can only be seen at a comparatively short distance. When seen from the moon, the blue surface dotted with white (where the snowy tops of great mountains rise above the blue) will appear as solid, and the edge as sharp as if it had no atmosphere at all; but during an eclipse of the sun, a thin but bright thread of crimson light will be observed round the dark disc of the earth.

MARS.

Diameter,	.	.	.	.	4,100 miles.
Distance from the sun,	.	.	.	.	142,000,000 miles.
Length of day,	.	.	.	.	24 hours 39 minutes.
Length of year,	.	.	.	.	686 days 23½ hours.

Beyond the earth is the small planet Mars. His day is nearly the same as our own, his year nearly double. His distance from the sun is so great as to deprive him of more than the half of the rays that fall to the share of our earth. At one time it was supposed that the atmosphere of Mars was even more dense than our own; according to Cassini, it is more than a hundred thousand miles

deep. Had this been the case the temperature at its surface would have been very high. This, however, has been ascertained to be a mistake, as no such atmosphere has been found to exist. The redness of its reflected light, and the visibility of its geographical features, prove that its atmosphere is exceedingly rare, and its temperature, on that account, exceedingly cold. Mars is probably the coldest planet in the system, not even excepting Neptune. The whiteness of the polar regions, which increases and decreases with the varying seasons, is an interesting circumstance. It seems to indicate the presence of snow, but it is not necessarily the snow of water, for there is no sea, and as soon as the snow is thawed it evaporates. A similar species of snow is often produced in our laboratories from carbonic acid gas. After being reduced to a liquid state by great pressure, when the stopcock of the reservoir in which it is generated is opened, it is forced out by its own pressure. On forcing itself into the open air with great violence, an intense cold is produced in consequence of its great expansion. This cold is sufficient to freeze the gas and make it fall in the form of snow, which is immediately thawed and absorbed by the air, without ever passing into the liquid state. There can be no inhabitants in Mars.

THE MINOR PLANETS, OR ASTEROIDS, OR PLANETOIDS.

The Asteroids are next in order, and are, in all probability, almost infinite in number. They occupy a zone nearly half way between Mars and Jupiter; and as they represent a single planet, their distinctive name would be Mero planets. They are so small that their form cannot be ascertained—the largest being not more than 250 miles in diameter, the others averaging not more than a

hundred. As it would require more than 50,000 of these to make a planet the size of Mars (which is nearly the smallest in the system), and as it is probable that the combined mass of this planetary family could not be less, we have good reason to believe that, besides those already discovered, there are millions of millions of smaller ones, ranging from twenty miles diameter to as many inches. It has been ascertained that, throughout the solar system, there is an ethereal atmosphere sufficiently dense to retard the motion of comets; and this retardation must increase with the smallness of the body that moves in it, because it presents a larger surface in proportion to its mass. This atmosphere, therefore, although it would have no sensible effect in retarding the motion of the larger Mero planets—such as Vesta or Pallas—must, in the course of ages, affect the motion of small stones. If, then, the orbits of these stones be continually contracting, it is not unnatural to suppose that they must pass the orbit of the earth in their spiral passage to the sun. It has been suggested that they have all formed a part of a disrupted planet, which at one time revolved in an orbit within the region of the Asteroids. It seems much more probable that, in conformity with the preceding theory of the formation of planets, they are the materials out of which a planet might have been formed, but never was. In confirmation of this view, we must observe that the meteoric stones are not oxidised except on the surface, and during their passage through our atmosphere. They, therefore, differ from the materials of our earth which have been oxidised. The question arises, Has no combustion taken place in that orbit, and is this the reason why they have not united to form one planet, as in the other zones?

JUPITER.

Diameter,	90,000 miles.
Distance from the sun,	485,000,000 miles.
Length of day,	9 hours 56 minutes.
Length of year,	11 years 9½ months.

Jupiter is the largest of the planetary bodies, having a day of ten hours, and a year equal to nearly twelve of our own. That it is possessed of an atmosphere, is proved by the varying pattern of its belts, and by the circumstance that none of its geographical features have ever been seen. What the depth of its atmosphere may be, and what the real diameter of the solid body of the planet, can only be judged of by a consideration of its specific gravity. The mere sharpness of its outline does not prove that what we see is solid. If the atmosphere of our own earth presents a sharp outline when seen from the moon, so might the atmosphere of Jupiter when seen from a distance so much greater. We are not to suppose, therefore, that the disc of Jupiter, or any other planet as we see it, is the boundary of the planet itself—it is only the boundary of its atmosphere, if it have an atmosphere. There are elements, however, by which we may make an approximation. Although we cannot tell how much of a planet is the solid body, and how much is air, we have the means of determining very accurately what is its weight. When, therefore, we find a planet specifically as light as water we may conclude that it has an extensive atmosphere; when on the other hand, we find the planet specifically much heavier than water, we may conclude that it has not an extensive atmosphere. The plan which we might adopt, therefore, in estimating the amount of atmosphere in Jupiter and the other distant planets, would be to obtain an average specific gravity of the

planets which we know, and apply that as the probable specific gravity of those which we do not know. Now, our own earth is rather under than above the average specific gravity of other planets whose solid proportions we know ; and if we apply this as the probable specific gravity of Jupiter, we find that, as the specific gravity of the whole apparent disc is only one-fourth of the density of the earth, a rough calculation would give somewhere about 55,000 miles as the diameter of the solid planet, leaving about 17,000 miles as the depth of its atmosphere. This cannot be very far from the truth ; for, although by one method of reasoning we might arrive at the conclusion that the planets are more dense as they approach the sun (for example, Mercury is denser than the earth, and the earth denser than Mars), yet the satellites of Jupiter, which we may suppose have no atmosphere, are exceedingly dense (Admiral Smyth assigns an average density *three times greater than our earth*) ; and, as our earth is more dense than its satellite, we have little reason to suppose that the satellites of Jupiter should be *more* than three times denser than the planet itself. We may calculate, therefore, a probable depth of atmosphere somewhere about 17,000 miles—being more than twice the diameter of the earth.

At first sight it might appear unlikely that the atmosphere could attain such a density as to appear solid at so great a height from the body of the planet ; but we must consider, first, that though, when viewed from the earth, the outline may appear to be sharp, a shading of a thousand miles breadth (and this is more than twenty times the depth of our whole atmosphere) would only be the ninetieth part of Jupiter's diameter. We must also consider that, with such a depth as we suppose, and with

such a central body attracting it, the density of the atmosphere must be very great, even in its higher regions.

It would be deeply interesting to investigate the effects of such an atmosphere, supposing the circumstances of the planet to be in every respect the same as our own, except in so far as we know them to be different. It would, in the first place, collect the rays of the sun much more copiously in proportion to its distance, and preserve them more economically than any of the inferior planets. If we find the difference of temperature between the top of Mont Blanc and the plains of Italy to be very great, what must be the difference between the temperature of the bare moons of Jupiter and the surface of the planet itself, covered with an atmosphere 17,000 miles high? Besides all this, if there be an internal heat in Jupiter, such as there is in the earth, the warm covering of its atmosphere, and the greater mass of the planet, would bring that heat out more to the surface. It has been a favourite speculation with astronomers to suppose how the constitution of the inhabitants of Jupiter might be so adapted to their circumstances as to enable them to live and enjoy life in the midst of eternal snow; but it is much more likely that instead of being cold, it is at present far too hot to permit either animal or vegetable life, such as exists on earth, to find a lodgment on its surface. The planet Jupiter, at the present moment, appears to be nearly in the same position as regards specific gravity that our own earth occupied some hundred thousand years ago, when the waters of the ocean and the carbon of the coal measures (united with oxygen in the form of carbonic acid) formed, with the nitrogen of the air, an atmosphere extending thousands of miles in height.

Could we pay a visit to the planet Jupiter, we might

find a comparatively flat and unbroken surface of country, with a shallow ocean washing its dimly-lighted shores. The water, though nearly red hot, will be prevented from boiling by the tremendous pressure of the atmosphere above; and it may be that a vegetation, rank, wild, and gigantic, rears its tangled branches into the almost solid atmosphere that gives it growth. There, too, at some future age, when the heat has declined, may sport among its shallow waters forms of animal life earlier than any which have been preserved with us. With such a heat, and in the vicinity of such subterranean fires, every deposit that found its way far down below the surface would be fused in simple granite.

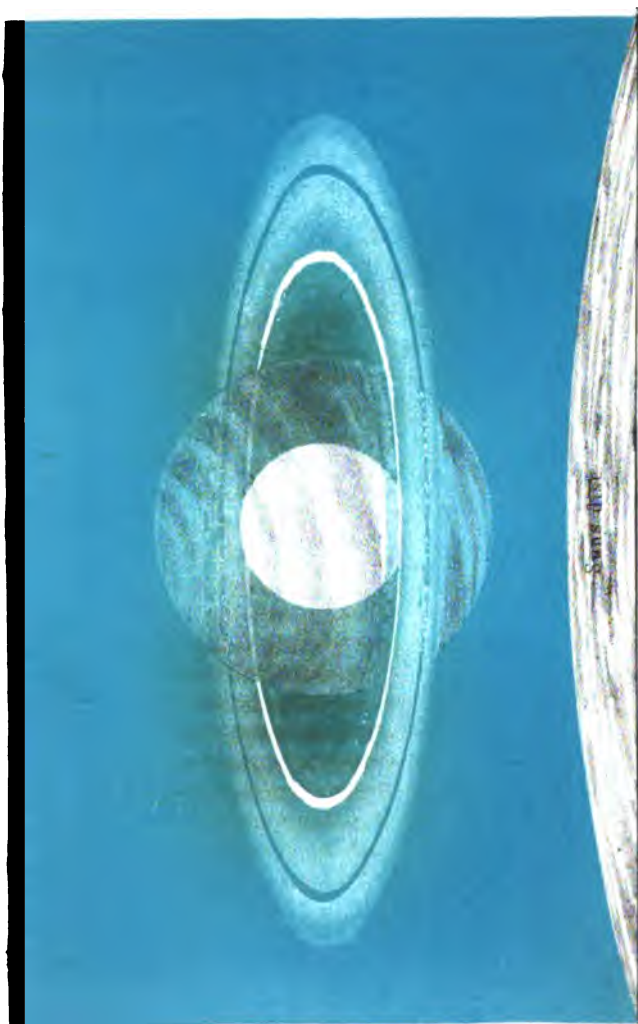
Jupiter revolves on his own axis once in every ten hours. If it shall be found that the axial movement is produced by the same law as the orbital; and if both be the result of a tangential force existing between two bodies, then the axial movement of a planet must have its maximum at the completion of its formation,—that is to say, when the last meteorolite has been added to its bulk. But if after that, in consequence of tides and atmospheric movements, which are derived from the force of its rotation, this axial movement is always decreasing, we must expect that, at the early periods of a planet's history, the rotation on its axis should be rapid. Might not the rotation of our earth at one time have been ten hours also? and might not arithmeticians tell us, by calculating the forces daily expended in tidal and atmospheric changes, how long ago it was that the earth's rotation was the same as Jupiter's? A curious question also arises as to the future of Jupiter's history. After some millions of years have passed, and the atmosphere of Jupiter has subsided into such proportions as our own, will not

the distance from the sun be so great as to render its cold unendurable, and life impossible? Perhaps not. While the atmosphere of Jupiter is decreasing, the atmosphere of the sun will be increasing, and if, in that time, the diameter of the sun's disc has increased one-half, its surface will have more than doubled, and its heat and light proportionally increased.

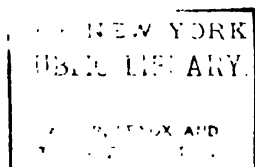
SATURN.

Diameter,	76,068 miles.
Inner diameter of rings,	117,339 miles.
Outer diameter of rings,	176,418 miles.
Distance from the sun,	890,000,000 miles.
Length of day,	10½ hours.
Length of year,	29½ years.

In this distant planet the light and heat derived from the sun is only the ninetieth part of the light and heat received by the earth. It has six moons and a system of rings, so thin as to be invisible (at least from the earth) when viewed in the plane of its diameter. So long as we overlook the fact that an atmosphere reflects light, and when viewed from a distance shews an edge as sharp as if it were a solid body, we are involved in anomalies and difficulties. We know that the specific gravity of Saturn and his rings is not greater than if it had been made of pine wood, *if we include* in our calculation the whole apparent bulk which it presents to the eye. When we consider, at the same time, that, on account of its great mass, gravitation must be more intense than on the earth, and the pressure of one particle on another greater, we should expect that the specific gravity, instead of being so much less, would be considerably more. All these difficulties are solved by the knowledge of the fact that the apparent disc of a planet is the limit, not of the solid



SATURN AS COMPARED WITH THE SUN



globe, but of its visible atmosphere; and if we assign to the body of Saturn a density the same as that of the earth, then its real diameter is reduced by one-half: most probably it is not more than 38,000 miles, while its atmosphere towers to a height of more than 20,000.

If the body of Saturn be so small as this, the rings assume an entirely new character—they cease to be a part of the planet, and now rank among the satellites in whose immediate vicinity they now exclusively are. Instead of being distant from the planet only 19,000 miles, they are in reality more than double that distance, while it must be remembered that they are only 32,000 miles distant from the nearest moon, and 62,000 from the second. They, therefore, form an interesting variety in the lunar system, similar to the asteroids among the planets.

The smaller specific gravity of Saturn, and consequently the greater proportion of atmosphere to the solid body, would indicate an earlier period in the history of planet-formation, when perhaps the crust is red hot, and no deposit of water has yet taken place. It would then correspond to the state of our earth at a still earlier age.

May we not also have here a representation of the manner in which our satellite was formed at that distant period, first as a ring revolving round the earth in twenty-nine days, until, its equilibrium being disturbed, it would collapse in the line of its orbit, and form a spherical instead of an annular satellite?

URANUS AND NEPTUNE.

Uranus and Neptune may be referred to in company, being very similar to one another in constitution, though their distance from the sun and the length of their years respectively are very different. Their size is much less

than Jupiter or even Saturn, but still much greater than the earth. Their specific gravity being no greater than that of water, would lead us to suppose that their atmospheres are, like Jupiter, very great, and that much of what has been said regarding him may also be said of them. At the same time we observe a singular inversion of the law of revolution—not only the axial motion of these planets, but the motion also of their satellites, is in a direction contrary to that which is found in all the others. This indicates a change of polarity of some kind, which takes place in the planetary system after passing the orbit of Saturn. What the nature of that polarity may be we have as yet no means of ascertaining, and under these circumstances any speculations on these planets must be doubly uncertain.

It ought not to be overlooked that the growth of Uranus and Neptune, or even Saturn, may not yet be completed. It is quite possible that there may be a large unexhausted supply of meteoric matter still ministering to a slow combustion still going on. There is nothing which has been observed in these planets inconsistent with such a supposition; and although it may not be possible to obtain proof of the fact, if it be a fact, still their probably late formation, compared with that of the earth, requires such a possibility to be kept in view.

In one sense, it may be said that, to a very small extent, the growth of our own earth is not yet completed, because every meteorolite that descends adds to its bulk. We have thus a visible illustration of the earth's growth in former ages continued to the present day. The earth, however, has grown cold since the supply of meteorolites has failed, and now it cannot volatilise them when they come, as it once did.

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NEBULÆ

CHAPTER XI.

THE STARS AND NEBULÆ.

UNTIL lately the attention of astronomers was almost exclusively directed to the solar system ; the sidereal heavens were regarded as a mere assemblage of fixed stars, so unchanging in their appearance and unvaried in their character as to possess very little interest. Since the days of Sir William Herschel, however, this department of astronomy has yielded far more magnificent results than the most imaginative philosopher had ever dreamed of.

We now know that the visible universe is composed, not of single stars, as we might imagine from looking up into the heavens, just as a man who has spent his life in a city might suppose the whole world to be filled with streets. The true denizens of heaven are small faint spots of light called nebulae, scattered through space, and placed at such inconceivable distances, that light must travel a thousand years before it can pass from one to another.

These little faint spots of light, when magnified by the telescope, present strange and unimagined forms, which require to be pictured rather than described. For this reason we prefer presenting our readers with portraits of a number of them, rather than attempt a profitless description. We merely observe, that of those which we have

selected for delineation, the most prevailing forms are those of the circular and annular nebulae.

And what, it will be asked, are these nebulae of which the visible universe is said to be composed? Our best answer is to select one of them, and go to see it. For this purpose we will choose No. 1, which at a great distance seems to be no more than a faint spot of light in the midnight sky, but as we near it we find it growing in size and brightness, until it has covered nearly half the heavens, spreading a faint glow of light where formerly there was only gloom. Onwards we go towards its very centre, and now we can see minute points of light, like star dust sprinkled over the sky. Still we proceed on our ethereal voyage, and the little points of light increase in distinctness and brilliancy until we discover that they are really stars. At first they appeared as if they were all close to one another, now they recede and separate, and at last, when we have arrived near the centre of the nebula, we find the whole heavens glittering above, beneath, and around us with a panorama of magnificent stars. The outer skirts of the nebula, however, are still very distant, and therefore still preserve their cloudy appearance, forming, as it were, a broad but irregular zone, that girdles the whole heavens, and that is called "The Galaxy, or Milky Way." Yes! it is quite true—almost the whole scenery that presents itself to our eyes upon a cloudless night is nothing more and nothing less than the spangled interior of one of these same nebulae. Our sun is but one of the stars situated near the centre of this mighty system, which stretches out into the dim distance; and it is only the stars of that nebula in our immediate vicinity that sparkle singly in the breast of night.

It is to this latter class that we would now turn our

attention, in order to notice some remarkable phenomena connected with them. As might be expected, these stars vary in brightness, not only according to their size, but also according to their distance. Some of them, probably, are smaller than our sun ; others of them, such as Sirius and Arcturus, we know to be larger. Their distance is so inconceivably great, that light requires upwards of three years to travel from the nearest of them ; and if this be the case with the nearest, imagination fails in its attempts to conceive the distance of the others.

These stars, of course, shine by their own light, and are therefore in reality suns. Many, if not all of them, must have planets revolving round them, and receiving both light and heat from their radiance. That there is abundance of variety in their constitutions is evident, not only from their difference in colour, but also from some of them being double. Stars that appear to the naked eye as *one*, are found, on the application of the telescope, to be composed of *two* stars, some, of three, and others, of a greater number. Observation has proved that these double and triple stars are continually changing their relative positions ; and, in regard to many of them, it has been ascertained that they revolve the one around the other, or around a common centre. When viewed through the telescope, these double stars appear as if the suns of which they are composed were very near each other. This, however, is not the case ; the orbit of Neptune would be too small to indicate their distance ; in many cases it must be a thousand times greater. Their planetary systems, therefore, will be in no danger of coming into collision, and even the perturbations of their planets by the companion sun will not be very observable.

A remarkable circumstance connected with these

double stars is, that in many instances they not only differ in colour, but, strange to say, the colour of the one is generally the complement or contrast of the other. For example, if the brighter of the two be red, its companion is generally inclined to be of a greenish hue. This difference of colour, which is so well marked in many of the stars visible to the naked eye, and still more in the double stars, seems to indicate a difference in the colour of the flame caused by the combustion of different kinds of meteoric fuel. Thus Arcturus, Aldebaran, Pollux, and Antares are reddish in their colour; Sirius, Deneb, Vega, and Regulus are white; Procyon, Atair, the Pole-star, and *Beta* of Ursa Major, are yellow; while Castor is observed to have a greenish tint. It is probable that in the case of the white stars, the want of any colour is due to the equal quantities of meteoric matter producing coloured flames of opposite tints, and that where the colour is decided there is a preponderance of a certain kind of fuel. Probably in the double stars one may attract one kind of substance, and the other another kind, and hence the opposition of their tints; but in any case we may safely infer that the difference of colour must be due to the chemical qualities of the fuel.

If this be the case, it is clearly not impossible but that, by means of the prismatic spectrum, we may yet obtain important information regarding the chemical nature of the substances of which each star is composed. When, by means of a prism, we analyse the light of any flame, we find a great variety in the patterns of the different spectra, even when their colours are not perceptibly different. Not only is there a different gradation of tints, there are also lines of different colours which appear in different parts of the spectrum, by which we can classify the

flames, and even discover the chemical composition of the substances which produce them. So great is the delicacy with which these effects are produced, that the presence of particular elements may be detected, though their quantity may be so minute as to defy the manipulations of mere chemical analysis. There is, therefore, a wide field of discovery in this direction open to us, possessed of deep interest. By means of a prismatic telescope the spectrum of every star may be read off with great accuracy ;* and from such a catalogue we may yet obtain a *chemical* classification of the stars, which may lead to important generalisations.

Another fact to which we must allude, is the variability in the brightness of many of the stars, and a periodicity which has been observed in the change. Some of them undergo all their changes in less than three days ; others in a period of many years, in which the star waxes and wanes in a regular manner, which it is very difficult to account for. It is the opinion of some that the two sides of a star may not be of equal brightness, and that when it revolves on its axis there will be a corresponding periodic change in its appearance. This is a supposition not inconsistent with the gaseous theory of the sun's light. The spots on our own sun are confined to the equator, and are comparatively unimportant in size ; in other suns they may be much more extensive. Were the polar regions of such a sun presented to us, they would be very much brighter than the equatorial regions ; and it is not

* This might be done by making the clockwork of an equatorial telescope move slightly faster or slower than the star itself. Its progression through the whole extent of the spectrum might occupy any length of time that might be necessary to record with sufficient accuracy each line or colour as it presented itself successively to the eye.

difficult to understand how a periodic movement would present these successively to our view. Another explanation has been offered, by supposing that a large opaque body is the central orb around which a bright star revolves, and that its periodic eclipse behind this dark object would account for its variable luminosity. This, though a possible, is not a very probable explanation, because it would scarcely account for the relative proportions of light and darkness. Such an obscuration would not only be sudden but short, unless we suppose that the diameter of its central body is nearly as large as the orbit of the star which revolves around it.

If light be produced by the vibrations of a universal ether, may there not be *lacunæ*, or vacuities in that ether, which would as effectually intercept the rays as a solid body interposed? This suggestion is made, not so much to account for such phenomena as variable, and appearing, and disappearing stars (although it may be connected with them), as to offer an explanation of certain black streaks and patterns which are projected with great sharpness upon some of the nebulæ, and which have all the appearance of dark objects in the heavens interposed between the nebulæ and our eye; and yet they are so much larger than, and their shapes so different from what we should expect such bodies to be, that even the imagination refuses to accept their possibility. If there be *lacunæ* in the heavens having such forms, their effect would be exactly such as we see inscribed on the nebulæ; but in that case they must very numerous, because, unless they happen to interpose between our eye and a nebula, we should have no knowledge of their existence. There might be bright stars behind them invisible to us, but we could not know it, unless, by some grand movement going

on among the stars, their relative position might be changed, and then they might suddenly emerge from behind the lacuna, as if they had been newly kindled. Such phenomena do occur, but it seems more likely that these are produced by another cause. For example, in 1572 a star suddenly appeared in the heavens as bright as Sirius itself, and after increasing in brilliancy for a short time, began to fade, and in three months entirely disappeared. Such a phenomenon could not be produced in the manner we have supposed, because in that case it would continue equal in brightness so long as it was seen. It is more likely to be produced by the fall of one star into another. If such an event ever takes place, and there seems to be no reason why it should not, the effect would exactly correspond with the description given by Tycho Brahe of the star we have referred to.

CHAPTER XII.

ARE THE PLANETS INHABITED ?

WE are now prepared to resume consideration of the question, Whether the earth be not, even in a scientific point of view, a very remarkable exception to other worlds, and therefore one which the infidel is not warranted in regarding as unlikely to be the scene of the incarnation ?

On a review of the whole solar system, as it has passed before us, the first thing that strikes us is the extreme diversity of all its members—not one of them resembling another, even in a remote degree. If, therefore, there be a certain warmth, a certain quantity and quality of atmosphere, a certain inclination of axis, and a certain size and density of mass, which are most favourable to the development of animal and vegetable life, one thing is certain, that these have not been all attended to in the creation of any of the planets except our own. In regard to it, indeed, these concurrent advantages are so marked, and so extraordinary, that it would be difficult to say how they might be improved ; while, in regard to the others, our only difficulty is to conceive how life can possibly exist in any one of them.

Those, therefore, who plead that all the stars must be inhabited, must take their choice of one of two lines of argument, but they cannot resort to both of them. They

must either hold that animal and vegetable life is independent of such circumstances—that plants and animals receive a constitution suited to the circumstances of each world, whether it be wet or dry, burning or freezing, naked or aerated. In that case, they must regard the constitution of our own world as altogether unimportant—the wisdom and goodness of the Creator being exercised, not in *its* preparation, but in the production of vegetables and animals adapted to this particular concurrence of circumstances, just as His wisdom and goodness are exercised in creating animals and vegetables for the sun, the moon, and the stars, in all their infinite varieties of climate and circumstances.

Or they must hold that there are certain requisites to animal and vegetable life, and that these may be more or less favourably combined in every celestial body. In this case, they will not only adore the infinite wisdom and goodness of God, that fitted the animal and vegetable life for being developed under such circumstances, but they will also admit that, in the formation of the earth as the abode of man, these requisite favourable circumstances have, by the wisdom and goodness of God, been provided by the operation of the natural laws. But they who adopt this latter position, must at the same time admit that, although these advantages have all united in the formation of the earth, they have not been so united in the formation of any other world, so far as we have an opportunity of knowing. They must not plead that, because they observe an atmosphere in one, a similarity of seasons in another, and hills and valleys in a third, therefore there must be animals, and vegetables, and moral and intelligent beings in them all. If all these requisites be not united, so as to provide the necessary

attributes of a world fitted to support animal and vegetable life as we find it, they cannot with any confidence assert that they are inhabited.

No doubt there may be animals and vegetables in every one of the planets, moons, rings, comets, and meteoric stones of the solar system, because nothing can be made in vain, and they may be so constituted as to receive life, beauty, health, and enjoyment, from whatever circumstances of physical nature they may be placed in, just as there *may be* a nation of men with tails in the interior of Africa, as has been often asserted ; but surely it is unreasonable, on the ground of such an admission, to ask us first to *believe* it, and then taking advantage of our unwary credulity, to call on us to surrender our faith in that which rests on evidence as conclusive as that upon which any fact in philosophy has been established.

But, perhaps one of our unbelieving friends will say, "No ! not on the meteoric stones. I do not mean to say that they are inhabited." Another more wary will add, "No ! not on the comets." A third more careful still will say, "No ! nor yet upon the rings." While perhaps a fourth may be found so modest as to add, "No ! nor yet upon the moons." But why these concessions ? Have meteoric stones, comets, rings, and moons all been made in vain ? Perhaps, an answer will be offered, that the rings and moons are made to give light to the inhabitants of the planets, while in regard to the stones and comets, they are not worlds at all. This, no doubt, is a line sufficiently distinct to be intelligible, but it is too arbitrary to command respect in an argument founded not on observation but on principle. Why, for example, should the large moons of Saturn be surrendered, on account of their intolerable cold, while the small planet

Mercury is retained with its intolerable heat? Moons, no doubt, are small sacrifices, but there are planets much smaller than they. Flora and Pamaona, and forty or fifty, if not thousands, of other minor planets, are mere toys compared with the satellites of Jupiter and Saturn, or even with our own moon ; and, therefore, having gone so far as to admit the desolate character of the lunar worlds, they cannot make a very determined stand in favour of the minor planets. If so, when once a breach has been made by their means in the planetary system, the *a priori* argument must be abandoned, and all the others may be allowed to surrender in succession.

It will be observed, that so far as we have gone, the opposite argument consists in speculations founded on deductive principles, not on positive observation ; and before proceeding to the remainder of the inquiry, it is well to expose the parent fallacy which lurks beneath, and which, till it be exposed, will cause the mind to cling to the suspicion, that after all, the stars "must be" inhabited. The fallacy consists in applying the characteristic excellencies of the organic creation to that which is inorganic.

In the organic world we find the most wonderful economy exemplified ; there is not a bone or a member that could be wanted, or made larger or smaller, or heavier or lighter than it is, without injury or inconvenience. Everything has its use, nothing could be spared, and nothing could be added without disadvantage. So universal is this law, that were we shewn a portion of any plant or animal, we might confidently assert that it had its use, and that it could not be more admirably fitted for use than we really find it. But, does this law apply to the inorganic world also? Certainly not ! on the contrary,

we observe the very opposite principle exemplified. Instead of economy we find a prodigality truly magnificent, and instead of ingenious adaptation, we find a profusion of wild and rugged majesty. And to which of these classes do the heavenly bodies belong? To the inorganic, of course. Had they belonged to the organic creation, we should have been assured of the impossibility of any of the heavenly bodies being uninhabited, just as we are assured that the eye was made to see, the ear to hear, and the heart to beat. In the organic world it may be said, in a peculiar and emphatic sense, that nothing has been made in vain. There is an economy of material, an adaptation of parts, and a prospective constitution almost infinite in detail and universal in application. The doctrine is infinitely true—so true that there can be no exception; and if worlds were made to be the abodes of intelligent and moral beings, there would be no failure and no exception. It is a lamentable descent from the appeal to God's economic perfections, to say that He may have made some worlds, such as the moon, without inhabitants, but He would not make *so many* as we see in the heavens. The argument, if it be used at all, must be without exception. If a world without inhabitants be made in vain, then *every* world must be inhabited.

The very existence of the fallacy is a wonderful feature in the argument. The Scriptures represent the world as possessed of superiority over almost all other worlds; the astronomer confirms the fact by discovering a remarkable combination of circumstances, which has rendered the earth so favourable to organic life, that a conclusion is hastily, but erroneously, drawn, to the effect that these advantages are not providential, but the immediate and miraculous product of infinite wisdom and creative power.

It is acknowledged that probably not one in a million of other worlds is endowed with the same arrangement and constitution as our own, and yet so happily have the lines fallen to us, that were any one to say that he could suggest a better, he would be called a presumptuous fool. Were he to say that a greater or less atmosphere would be better—that it could be more salubriously compounded—that the proportions of sea and land might be better than they are—or, in short, were he to say that in any respect the astronomic arrangements of our planet might be improved, he would be regarded much in the same light as one who would suggest a better material for bone, a better shape for an arm, or a more economical arrangement of muscular action.

In attempting to magnify the wisdom and goodness of God by the doctrine of economy in inorganic matter, we rather detract from the grandeur of His power. If a nobleman were to fill the avenue in front of his palace with cottages and cabbage-gardens, or even to raise crops upon it, it would indicate poverty rather than wealth. So long as there is no scarcity of land, mankind would never lament the rugged magnificence of Alpine scenery, its inaccessible mountains, its dangerous glaciers, and its boundless wastes, because the soul requires some great outlet of this kind, to allow it to expand, and to go out in sublime imaginings towards the infinity of God.

We cannot tell the thousand uses to which planets may be put, nor is it necessary that we should. The production of peculiar minerals, the growth of certain vegetables or animals, the exhibition of certain laws in operation, the establishment of telegraphic communication between certain parts of creation, or the resting-places of angels,—all these may, for aught we know, be the purposes for

which they were made; and we suggest them, not because we believe in them, for we do not, but because they are sufficient to silence the objector. He may call it presumptuous to form such speculations, and he would be right in his censure, but he may be assured that the presumption of the man who would affirm these to be the purposes for which God made the stars would not be so offensive as that of the man who would affirm that God *could* have no purpose in view, but one which man can even now know, and understand, and appreciate.

We might rather ask, What are all the plants and animals of our world created for? They all have their use, but it does not follow that we know it. There are many vegetables that have been created to provide food for man, and many animals created to live and die for his greater convenience and comfort; but it does not follow that every plant can be eaten, and every animal domesticated.

“ Full many a flower is born to blush unseen,
And waste its sweetness on the desert air; ”

and so may there be many a world on which the eye of neither man nor angel has ever rested,—some, like the moon, a desert of cracked and shrivelled lava; some, like Pallas or Vesta, perhaps worlds of gems, and crystals, and spars; some, like Flora or Pomona, perhaps worlds of forests and flowers; while others, like our own in past geologic ages, may be the abodes of megatheria and pleososauri, with pines, and ferns, and mosses. Some may still be incandescent masses of molten rocks, without the possibility of affording even shelter to a plant or animal; while thousands of others may be bound in eternal frosts, with a temperature a thousand degrees below zero. The earth among the planets looks more like Adam among the

beasts than any analogy which the infidel's ingenuity can supply.

But even the earth itself bears testimony on the subject. It is not every part of the world that is inhabited by man, or that can ever afford him a comfortable home. When we look at its mountains and hills, and contemplate the awful grandeur of their rugged masses, and the almost inconceivable magnitude of their contents, these are but the freckles and granules of a grander body, viz., the planet itself. Where is the economy of matter here ? In order to support the exterior film of organic life, which at present exists upon the world, there is provided a mass of mineral matter in the inside, so great as to defy all efforts of our imagination to conceive its quantity, proving how little God accounts of mere matter in comparison with organisation and life.

But this is not all: in consequence of the variety of climates upon the earth, we have real specimens of the way in which the Creator deals with them ; and from these specimens we are entitled to assume that the principles which we recognise in action here will be found to prevail elsewhere. We have, in the first place, the summits of lofty mountains towering high up into the atmosphere, representing, in some degree, those worlds that have none. If it were true that every condition of world has its appropriate inhabitants, we would find these mountain solitudes covered with vegetation, and teeming with animal life. Are plants and animals wanting because God *could* not make them ? Of course not. It is because it is contrary to physical law, and He *does* not make them. Again, we have the craters of volcanoes, burning deserts, and *meres de glace*, in none of which do we find any animal or vegetable life, but only desert solitudes ; not

because God could not create organisms that would flourish there better than in any other place, but because it is part of His economy that there should be circumstances which produce sterility, and other circumstances that should produce luxuriance of life. To have ordained it so that all should be genial and nothing barren, or that the laws which regulate these alternatives should be inoperative, would be to destroy the very foundations of order and beauty.

Not but that there is a variety of organisation, so as to provide inhabitants for every variety of climate where organisation is possible. We have tropical plants and animals, and we have arctic plants and animals ; we have vegetables that flourish in one climate, but not in another. Pine-apples will grow where strawberries will not grow, and strawberries will grow where pine-apples will not. This principle pervades all nature, and may be applied to the celestial bodies with tolerable certainty ; so that wherever there are circumstances which would afford life to any organism, we may be sure that they will be early rendered available. So it is on earth, and so it must be in the heavens, if God's laws are the same there as here, as no doubt they are. But we are not to infer from this that wherever there are animals and vegetables, there also must be moral and intelligent beings. It is true, that on earth man is found in almost every climate, so that he may be said to be a denizen of every country where animals and vegetables are capable of existing ; but we are not to infer from this that on every star where organisation is possible, there must also be creatures such as man. Waving the question whether man's habitation of any but genial climates be a natural or an artificial arrangement, we have sufficient proof, in the discoveries

of geology, to regard the creation of man as an extraordinary and abnormal event, not likely to be repeated except under circumstances of the most favourable kind.

If the discoveries of astronomy reveal the boundless extent of space, geology opens up to us views, equally grand, of the duration of time. By means of the different strata of which the earth is composed, one lying above the other, and each requiring thousands of years to accumulate, we obtain the means of reading the past history of our planet ; and as each formation contains imbedded in it the remains of the plants and animals of the period, we can, in imagination, restore the landscapes of each age, beginning with the earliest appearance of vegetation and animal life. These succeed each other in the history, presenting us with species which appear at one period for the first time, and after continuing for, perhaps, thousands of years, disappear, never again to be seen, except in the stony sepulchres which receive and preserve their remains. In this manner we have entire creations rising and falling—rising over the ruins of former organisms, and falling to give place to new occupants of their habitations. During all these hundreds of thousands of years, we have successive groups of fishes, and saurians, and birds, and beasts, and insects ; but in all their history there is not a vestige of human remains to be found among them. It is only at the very close of the geologic era that man at length appears. His entrance too is abrupt. All other creatures come in groups, preceded and succeeded by kindred races, and side by side with relatives. Man appears alone ; as if in all that preceded him the earth had brought forth grass, and herbs yielding seed, and trees yielding fruit, and as if the waters and the earth, at God's bidding, had brought forth

their motley races, in successive eras of geologic time, each creation in its order, varying in its beauty, and though changing in its form, yet always oscillating within certain limits, till on one peculiar and unprecedented day God said, "Let us make man in *our* image, after our likeness; and let them have dominion over all the earth. So God created man in his own image, and breathed into his nostrils the breath of life; and man became a living soul." Such is the testimony which geology provides, when questioned in the name of simple truth and unprejudiced philosophy; and whatever else she may affirm, she can never swerve from a clear and distinct annunciation of the fact, that man is a miracle in the universe, whose advent is sufficiently important to become an era in universal chronology.

Astronomy alone might alarm the doubting Christian by presenting a magnificent difficulty; geology reassures him by presenting as magnificent a solution. "You are but a tiny speck in the bosom of creation," says Astronomy. "True," replies Geology, "but here there is one gem of that creation, before whose moral and intellectual greatness suns and systems shrink into comparative insignificance." According to geology, not once in hundreds of thousands of years will any planet blossom into so wonderful a flower as man. The last six thousand years appear, in geologic reckoning, as but yesterday compared with the eras which preceded them; and if we look back on the far-stretching ages of the previous history, all that would present itself would be a countless succession of the lower animals; creations on creations rising, culminating, and departing, each leaving for its record nothing but its sepulchre of bones. If, during these long ages, some wandering intelligence had flitted about creation to see

what each world contained, the same hasty philosophy which peoples every star would, from the same premises, and judging of other worlds by what he found in this, conclude that there was not one inhabited by an intelligent race of beings. It is only when we discover the miraculous creation of these latter days that we admit the possibility of such an event also in other worlds.

If in each geological deposit we had uniformly, or even occasionally, discovered traces of intelligent beings mingled with those of the lower creations, we might have been justified in regarding the present dynasty of man an ordinary representation of what might be expected in other worlds. But when we find, throughout the eras that have rolled onwards and onwards through the past, not one trace of an intelligent being, or anything that would even hold out the prospect of a coming man, we are shut up to the conclusion, that though this little spot of earth may, to the astronomer, appear lost in the magnificence of the stellar universe, geology unites with revelation in representing it as a very metropolis of moral and intellectual greatness.

There may be other worlds in space in which similar miracles of creation have been performed, and amidst that select number there may be also some in which a sinful fall has tainted their moral atmosphere, and dimmed their glory ; but there is not, and cannot be another on which the Son of God assumed the form of a servant, and for sin condemned sin in the flesh. It is to this third planet, circling round an undistinguished star, that every eye in the universe must be turned, as the spot upon which the greatest event in the wide creation has been accomplished—the incarnation of the second person of the Godhead, the birth-place of the Man whose kingdom ruleth over all.

Christianity need fear nothing from the advance of science; on the contrary it will always derive fresh confirmation from every accession of philosophic truth, and acquire greater splendour and illustration from every ray of light which can thus be shed upon it. Each seeming attack may overthrow some fallacy, either of philosophy or biblical interpretation, but the simple truth as it is in Jesus is bettered by the riddance, and stands out only the more majestically by the change.

CHAPTER XIII.

THE RETROSPECTIVE APOCALYPSE OF MOSES.

WHEN geology was first becoming a science, men were startled at its revelations, and many thought that Scripture had at length been proved untrue. The Mosaic account of creation seemed not only to be superseded, but actually to have met a complete contradiction in its most important assertion, viz., the time occupied in the creation of the universe. If there be one feature more than another which distinguishes the Bible testimony regarding it, it is this, that in six days God created the heavens and the earth, the sea, and all that in them is, and rested on the seventh ; and it is upon this point also that geology gives its most emphatic and most characteristic testimony, affirming that the creation of the world occupied a length of time so great, that it must be measured not by days, but (if it can be measured at all) by thousands of years.

So complete and so decided seemed the contradiction, that many religious men at once abandoned all hope of reconciliation, and choosing their side, did not hesitate to affirm that geology was a fallacy, and its inductions false. They cut the gordian knot, because they despaired of ever solving it. This class of theologians was never very large, and at the present day is very nearly extinct. Christian philosophers at once perceived, that such a defence was nothing more than an unconditional surrender of the

Divine authority of Scripture, and various explanations were offered to account for the apparent contradiction.

The first and most successful was the interpretation given to the word "day" in the Mosaic narrative, which was held to mean, not a period of twenty-four hours, but a period of indefinite extent, stretching, it may be, to a thousand years; and then it was supposed that all the incidents of the Mosaic narrative would be found to harmonise with the discoveries of geology. And, indeed, at first it did appear as if such would have been the case, and that the time would come when we should be able to mark off in our geologic maps the various formations of the different days. More accurate investigation, however, proved this theory to be false; and although there was a wonderful coincidence in the general features of the organic progression in the order of creation, in the Mosaic and the geologic cosmogony, still it was found that they did not altogether coincide. The periods of creation, as marked in the geologic history, were not so much contributions to a progressive system of zoology, as renewed and enlarged creations of all kinds, consequent on the destruction or exhaustion of those which preceded them. For example, instead of finding that at one period there were plants but no fishes, and then plants and fishes but no quadrupeds, we find that each successive era has its own plants, its own fishes, and latterly its own quadrupeds; and although, no doubt, we do find that there is some degree of increase in the development of organic life in the different eras, very much like what is represented in Genesis, still the mere substitution of an indefinite period of time for a day of twenty-four hours will not transform the Mosaic narrative into an accurate representation of the creation of all things.

Another and more cautious theory has been adopted by another class of philosophical interpreters, who concede to the geologist all that he does or may yet demand in regard to the creation or creations of the world before Adam; but fixing on the present conditions of the earth, as the creation of which Moses wrote, they assert that all that is written in Genesis is literally true, and that the six successive days of creation found the earth in a state of ruin consequent on some great natural catastrophe, which not only extinguished all vegetable and animal life of previous creations, but so affected the very ocean and atmosphere as to produce a watery chaos, such as would be described by these words, "The earth was without form, and void; and darkness was upon the face of the deep."

Until we have found the true key to the Mosaic account of creation, this probably is a most convenient answer with which to silence the infidel who would insist on an immediate solution, which certainly we are not bound to give him; at the same time, it is not very satisfactory to the Bible student; for, apart from other difficulties, it has this objection, that the Mosaic narrative ceases to be an account of creation as we understand it. It describes the origin, not of the earth, far less the heavens, but merely of its present tenantry. To secure a literal interpretation in one particular, it is not satisfactory to sacrifice not only the literal in every other, but even the grand and primary meaning of the entire text; for if those passages of Scripture, in which the words six days occur in connexion with creation, do not assert the creation of the whole universe, then is Scripture silent on the subject, and, what is more, language is incapable of asserting that God is its Creator.

The fundamental error appears to lie in expecting a scientific, or even a historic explanation of cosmogony in

an inspired revelation. They who require or expect in Genesis a treatise on geology will be equally disappointed with those who expect a book of history in the Revelation of St John. Scripture avoids giving any assistance either in art or science; and we have already shewn that this constitutes one of those grand distinctive features which give evidence of the divinity of its origin. Infidels acknowledge that its ethical system is so perfect that it was obviously written by men far in advance of their age; but if so, why did these men rise so far above their contemporaries, and yet make no other discoveries of a more scientific kind? How did their eagle-glance penetrate so far into futurity, and descry with so accurate an appreciation facts and principles in moral and intellectual philosophy, which thousands of years afterwards were still undiscovered and unknown to the philosophers of Greece and Rome, and only in the present day are beginning to be recognised as something responsive to the very nature of our constitution both in aptitude and power? How is it that such giant minds should fail to discover a single truth in science, or aid the toils of their brother man by one useful invention? To the Christian the answer is easy. Scripture is addressed to men of all ages, and was not intended to supersede philosophical inquiry. If it did make revelations in physical science, where would they begin, and where would they end? A volume as large as the Bible would not have brought the Israelites abreast of the present generation, and after it had done so, of what further use would it have been to us? It was necessary therefore to speak the language of current knowledge only; and it was not expedient that Moses should make a contribution to geology, any more than he should to astronomy or chemistry. It did indeed become necessary

to announce to the Church, through the people of Israel, that their God was the only Creator of the universe, and to tell of "the rest" that remained to His people; but in doing so it would have been impossible, even though it had been desirable, to describe intelligibly the manner of creation, without revealing a thousand other things in all the other sciences.

In the prospect of future discoveries in science, it was indeed necessary so to write that all should be convinced that the author was intimately acquainted with the whole subject, and wrote in a cypher which could only be understood gradually as discovery advanced. In fact, it was necessary to adopt the same plan of revelation which guided the pen of prophecy. The strictly prophetic writings are so worded, that they never could be mistaken for history. Being written before the things which they describe took place, they must be so written, that they never could become the cause or the excitement to their fulfilment. For example, were we not certain that Hazael had already determined on the murder of his master, the announcement of the prophet that he was to be the king of Syria, might have been the very means of suggesting the crime; so in regard to the events that are future, were these historically described, not only would the spontaneous actions of men be interfered with by what they might regard as fate, but the very end and object of prophecy would be frustrated, which was that when these things come to pass we might believe.

The same principle was necessary, though perhaps for a different reason, in writing an account of creation; future discovery, as well as future history, must not be really anticipated, and yet there must be sufficient evidence that the Author could have anticipated them if He chose.

Let us then examine whether this be the true character of Moses' account of creation ; and if so, to what conclusions it would lead us. For this purpose we must inquire what are the characteristic features of the prophetic, or rather the apocalyptic style.

First of all, we find that it assumes the *dramatic* form, dividing the history into different acts or scenes, which will on that account be more easily remembered, and representing the incidents thus isolated in a pictorial and at the same time allegoric form, so as to convey strong impressions regarding their general character, rather than an accurate knowledge of their details. Such is invariably the style, not only of prophecy, but of every description which is revealed to us of things which we are incapable of understanding. Take, for example, the description of Christ's glory and the saints' inheritance in heaven. He sits at the right hand of God ; and they are laid in Abraham's bosom. He sits in the midst of the throne, in the form of a Lamb as it had been slain ; they stand before the throne, having crowns of gold upon their heads, palms in their hands, and harps of gold. He leads them like a shepherd ; and they drink of the water of life that flows from the throne of God : and God wipes away the tears from their eyes.

In the same style, but more completely in the dramatic form, is Daniel's prophecy regarding the four great monarchies of Babylon, Persia, Greece, and Rome. Each of these monarchies is represented by a single beast, whose nature and appearance symbolise the character of their respective governments. By this means the history of the world, during several centuries, is sketched off in a few sentences, brilliantly coloured, and full of meaning.

Let us look next at the Revelation of St John, in

which the subsequent history of the world is represented. We can now speak with some confidence regarding the six trumpets which announced the rise of the Papacy, and the seventh which introduced the six vials which represented its overthrow. So completely has the prophecy assumed the dramatic form in this miraculous production, that a mingled history of political and ecclesiastical catastrophes, extending through more than twelve centuries, is crowded into two acts, each having only six or seven scenic representations.

The similarity of the opening chapter of Genesis to the closing scenes of the world's history in Revelation, is very marked; and this is not the only feature in which the beloved apostle resembled the ancient friend of God. The septenary arrangement in both is conspicuous, and the dramatic form the same; seven seals, seven trumpets, and seven vials, correspond with the seven days mentioned in Moses. We perceive also a symbolic character given to each. In the first trumpet and first vial, the earth is the scene of the events; in the second trumpet and the second vial, the sea is turned into blood; in the third trumpet and the third vial, the rivers and fountains of waters are visited with similar judgments; in the fourth trumpet and fourth vial, the sun is the subject; in the fifth trumpet and vial, we find darkness and torment; in the sixth trumpet and vial, the river Euphrates is the scene of events; and in the seventh, voices, thunders, earthquakes, and hail. So in Genesis, we find a single idea made to represent the work of each day: on the first, the light; on the second, the firmament; on the third, the land and vegetation; on the fourth, the sun and stars; on the fifth, the birds and fishes; on the sixth, man and the beasts; and on the seventh, rest and benediction.

The dramatic form is still further conspicuous in Revelation, in the words as well as the actions of the septenary arrangement. Repeatedly do we find the voice from heaven supplementing that which could not be represented by action and scenery alone. Thus, "I heard a voice in the midst of the four beasts say, A measure of wheat for a penny, and three measures of barley for a penny; and see thou hurt not the oil and the wine" (Rev. vi. 6); and again, the souls under the altar cried with a loud voice, "How long, O Lord, holy and true, dost thou not judge and avenge our blood on them that dwell on the earth? And white robes were given unto them; and it was said unto them, that they should rest yet for a little season, until their fellow-servants also and their brethren, that should be killed as they were, should be fulfilled" (Rev. vi. 10, 11). Thus again, the kings of the earth, and the other enemies of the Lamb, said to the mountains and rocks, "Fall on us, and hide us from the face of Him that sitteth on the throne, and from the wrath of the Lamb" (Rev. vi. 16). In like manner, we find in Genesis the same form of dramatic narrative, ascribing to God verbal commands which it is not necessary to suppose were literally spoken.

Another characteristic in the style of prophetic narrative is the double signification or application to different circumstances and events. For example, the country promised to Abraham and his seed, was not only the land of Palestine, which was entailed on his posterity after the flesh, but that heavenly inheritance which was given to those who, by faith, are Abraham's seed and heirs according to the promise. Again, the seventy years prophesied of by Jeremiah applied to three distinct periods of captivity, each of which extended over seventy

years. David, in many allusions to himself and Solomon, used expressions by inspiration which could legitimately apply only to David's Lord. Christ himself, in foretelling the destruction of Jerusalem, spoke in sentences which at the same time described the last judgment; inasmuch as His references to both are conceived in language so constructed, that it is impossible to apply them literally to either separately; and yet the general features of both are most accurately, and at the same time most graphically represented.

We have Scripture authority for applying the same principle of double interpretation to the Mosaic narrative of creation. Paul, in quoting that portion of it which describes the formation of Eve, applies the circumstances of the narrative to the duties of husbands to their wives, saying, "For no man ever yet hated his own flesh; but nourisheth and cherisheth it, even as the Lord the Church: for we are members of his body, of his flesh, and of his bones. For this cause shall a man leave his father and mother, and shall be joined unto his wife, and they two shall be one flesh. This is a great mystery: but I speak concerning Christ and the Church."*

Not that he regards the account of woman's creation as a mere myth, which was intended to represent only spiritual truths. On the contrary, his object in quoting it was to establish the intimate relation which was thereby affirmed to exist between husband and wife. But his eye caught, at the same time, another illustration of his subject in the union between Christ and His Church, which he had spoken of a few verses previously, and which he asserts, by inspiration, was also affirmed in the Mosaic Scriptures in those very words which he had quoted.

* Eph. v. 29-32.

He says, "This is a great mystery," evidently implying a much more extended analogy between these two great works of God, CREATION and REDEMPTION, than is specified in the few words which he devotes to it. But since he does affirm the principle, that Moses, in speaking of creation, spoke also concerning Christ and the Church, we are not guilty of presumption in humbly, and with great submission, seeking, in the other portions of the same narrative, instruction in righteousness as well as instruction in geology.

We may not be able to apply aright this typical mystery in all its parts; but if Paul could read in the *last* act of creative power, which brought from the wounded side of the first Adam the perfect and lovely bride who was to share his paradise, a shadow of the last act in the history of redemption, may we not also, in the *first* exhibition of the Creator's power and goodness, when He said, "Let there be light, and there was light," observe a shadow of the promise in Eden which threw the first ray of hope upon the dark chaos of the fall? Nor is this altogether a fanciful reading of the mystery; for "God, who commanded the light to shine out of darkness, shined in their hearts, to give the light of the knowledge of the glory of God in the face of Jesus Christ." *

The intermediate features may not be so easily distinguished; but if we be permitted to reflect on this portion of the book of Genesis the symbolism of the Revelation of St John, so far as it has been ascertained, we may succeed in throwing some light upon the subject. It is not the intention of the author, in the present work, to exhaust, or even to investigate, this view of Moses' narrative; it is sufficient for his purpose to vindicate its legiti-

* 2 Cor. iv. 6.

macy, and, therefore, he will only make use of those interpretations of the Apocalyptic symbols upon which commentators generally are agreed.

In St John's Revelation, "light" symbolises hope, happiness, and peace :

The heavens symbolise civil government :

The sun, moon, and stars symbolise kings, princes, and governors :

The earth symbolises the world, as distinguished from the Church :

The sea symbolises the Church in its militant state, as distinguished from the world : and

The bride symbolises the Church of Christ in its glorified state.

What effect, then, would these interpretations have upon the history of creation, as symbolising the history of the world, or rather of the Church, for the world exists only for the sake of the Church ? Might we not read it thus ?

The first day's work, which consisted in the *creation of light*, symbolises the revelation of the gospel in Christ as the object of faith. This was first published in Eden.

The second day's work, which consisted in the *creation of the firmament*, symbolises the institution of civil government.

The third day's work, which consisted in the *separation of the land from the sea* and the creation of vegetation, symbolises the institution of the visible Church in the call of Abraham. May not vegetation symbolise spiritual nourishment, whether it be ordinances or the Word of God ? If so, may not the creation of grass, herbs, and trees, symbolise the contemporaneous ordinances, revelations, and covenants, which always accompanied each fresh consecration or limitation of the Church ?

The fourth day's work, which consisted in the *creation of the sun, moon, and stars*, symbolises the rise of the central monarchies, beginning probably with Babylon and ending with Rome. (This is rendered the more probable from there being no sun in the new heavens of Revelation.)

The fifth day's work consisted in the *creation of birds and fishes*. Perhaps we have no warrant for any interpretation of this symbol; but there is some slight reason for supposing that the development of a higher type of animation, in the sixth day's work, above the fishes and birds of the fifth, points to the institution of the Jewish Church as an imperfect development; and consequently the sixth day's work, in so far as the lower animals are concerned, would represent the New Testament dispensation, as the perfecting and fulfilment of the old. This, however, may be mere fancy, as it has no warrant in Scripture.

The sixth day's work, which consisted in the *creation of the beasts* and then of *Adam and Eve*, symbolises the incarnation of Christ, the image of the invisible God, receiving His humanity from the dust of the earth by the Virgin Mary, by the immediate act of Deity in Trinity, and His establishment in the government of the world, "The first Adam was made a living soul, the last Adam was made a quickening spirit." * The author of the Epistle to the Hebrews† applies the eighth psalm also to Christ thus: "But one in a certain place testified, saying, What is man, that thou art mindful of him? or the son of man, that thou visitest him? Thou madest him a little lower than the angels; thou crownedst him with glory and honour, and didst set him over the works of thy hands: thou hast put all things in subjection under

* 1 Cor. xv. 45.

† Heb. ii. 6.

his feet. For in that he put all in subjection under him, he left nothing that is not put under him. . . . But we see Jesus, who was made a little lower than the angels for the suffering of death, crowned with glory and honour ; that he by the grace of God should taste death for every man."

The seventh day symbolises the rest of God, into which we are to enter. This rest "remaineth," "although the works were finished from the foundation of the world" (Heb. iv. 3); and John concludes his picture by introducing the happy pair into the paradise of God, where the tree of life is again planted, from whose life-giving influence they are never again to be banished.*

How, then, are we to understand the Mosaic narrative? Is it a mere allegory? By no means, else were every other portion of the books of Moses an allegory also. Every single portion of them is typical, and yet they are authentic history. So it is with the first chapter of Genesis: we may affirm it to be a history as real, and a record as literal, as was at all possible, consistently with the purpose for which it was written. It was written for the Hebrew bondsman as well as for the Christian philosopher—to reveal the great features of creation to the one as far as it was possible for him to receive them, without anticipating the discoveries of science for the other.

The present state of physical science is not by any means so far advanced as to entitle us to pronounce a judgment upon its literality. It may be a far more literal account of creation than we suppose; and we may find it so when we come to know more about it, and are able to appreciate more accurately the full scientific value of each of the elements of this wonderful narrative. He

* See Appendix D.

who wrote it knew more than we do. Yet even now we are able to see reflected in it the great general features of geologic discovery. So much is this the case, that we may safely challenge the best geologist in the world to write, *even on his own theory*, and in as few sentences as Moses has done, an account of creation which would be so intelligible to an uneducated mind. Let any man try it, and it would be found, fifty years after this, that he had written it wrong, while Moses' statements would still be found to be true.

When we put all these things together, we may well say that the wisdom of men is foolishness with God. This wonderful chapter was written more than three thousand years ago. It was written to comfort and elevate God's people, who had been the down-trodden slaves of a pagan power; but it was so written, that, while it would harmonise with the future discoveries of natural science, it does not reveal one scientific doctrine which can be discovered by the human intellect alone. None but God could speak so simply, and yet so effectively. Nothing but inspiration could thus sketch out the grand features of creation in a few sentences, which would at the same time flash forth, as it were, the programme of the ages that were to come.

CHAPTER XIV.

THE NEBULAR THEORY IN GENESIS.

WITH these preliminary remarks, we will now proceed to compare the Mosaic record with the discoveries of science, in order to ascertain how far they are consistent with one another.

What is called the nebular theory, is the only theory which attempts to explain the great facts of astronomy, as the result of the operation of natural laws. It is true that it has not received the confirmation that was expected, from the revelations of the sidereal heavens obtained by Lord Rosse's telescope. At the same time, it must be remembered that the resolution of the nebulae by that wonderful instrument, while it does not *confirm*, certainly does not *disprove* the great idea upon which the theory is founded,—viz., that all the celestial bodies are produced by the condensation of an exceedingly thin and almost imperceptible substance spread throughout space. According to this theory, our earth, as well as all the planets and stars, were formed from an atmosphere millions of times lighter than air, somewhat after the same fashion as drops of rain are formed by the condensation of the watery vapours that float in the atmosphere.

This, although it constitutes the leading principle of the theory, is not the whole of it; but as the object of the present chapter is not to explain or discuss it, the reader is referred to other sources for a detailed account

of this ingenious speculation,—all that is proposed at present being to shew that if this great fundamental principle of the nebular theory be established, the Mosaic narrative of creation will be found to harmonise with it in a very remarkable manner.

If it be true that the Creator at first merely called into being the materials of the universe in the state of a thin atmosphere, and that the substances of which the earth is composed were originally expanded over a large space in the heavens; in short, that it formed only a part of the general chaos or atmosphere, without being distinct and separate from it; then the first verse of Genesis would ascribe the creation of this substance to Jehovah God.

1 In the beginning God created the heaven and the earth.

That is, He created the materials of which the sidereal heavens are composed, including also, of course, the earth : and the second verse would describe the character of this chaos ; at least it would describe that part of it whose history especially was to be the subject of the narrative.

2 And the earth was without form, and void ; and darkness was upon the face of the deep : and the Spirit of God moved upon the face of the waters.

When the Spirit of God moved or brooded over this chaos, what we call the natural laws were not so much the consequence, as the method of His operation ; and the first result was the production of light. Whether this happened in the manner described in the ninth chapter of this essay is of little importance ; the evolution of light during condensation of any kind is not a difficulty.

3 And God said, Let there be light : and there was light.

4 And God saw the light, that it was good : and God divided the light from the darkness.

5 And God called the light Day, and the darkness he called Night. And the evening and the morning were the first day.

After the light had been created, or according to our supposition, after stars had been kindled, this condensation would be followed by a division of the chaos into parts; so that the materials of each star would be detached from the surrounding chaos, and an intermediate expanse would be formed between them. So it would happen with the earth; the materials of which it is composed, though originally a part of an undivided whole, would gradually concentrate itself apart from all the rest, and when combustion commenced and terminated, would become a sphere.

This change is described in the following verses :—

6 And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters.

7 And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament : and it was so.

8 And God called the firmament Heaven. And the evening and the morning were the second day.

Let us examine the passage a little more carefully to ascertain whether the words will bear this novel interpretation : first, let us examine the description given of the chaos.

1. It was without form, and void.

2. Darkness was upon the face of the deep, and the Spirit of God moved on the face of the waters.

1. The Hebrew word *tohu*, which is here translated “without form,” occurs so seldom in the Bible that its meaning can only be determined by the sense of the passages in which it is found.

The following are the only other passages in which *תִּהְיֶה* occurs:—

1. Deut. xxxii. 10. He found him in a desert land, and in the "waste" howling wilderness.
2. Job vi. 18. The paths of their way are turned aside; they go to "nothing," and perish.
3. Job xii. 24. He taketh away the heart of the chief of the people of the earth, and causeth them to wander in "a wilderness," where there is no way.
4. Job xxvi. 7. He stretcheth out the north over the "empty place," and hangeth the earth upon nothing.
5. Isaiah xxiv. 10. The city of "confusion" is broken down.
6. Isaiah xxxiv. 11. He shall stretch out upon it the line of "confusion," and the stones of emptiness.

The general idea conveyed in these passages is that of *emptiness*; and accordingly lexicographers thus express the shades of meaning which it has conveyed to their minds: "emptiness, a vain thing, nothing, desolation, a desert, wilderness, in vain."

There are two of these passages which especially invite attention, because they express exactly the idea which the nebular theory requires. These are Job xxvi. 7 and vi. 18. "He stretcheth out the north over the *empty place* (*עַל-תִּהְיֶה*), and hangeth the earth upon nothing." This opinion is strengthened when we remember that in Hebrew poetry we generally have each verse presented in the form of a couplet, the second idea being often a repetition or variation of the first. Thus, in the previous verse it is said—

"Hell is naked before him,
And destruction hath no covering."

Here the idea of "destruction" is a variation of the idea of "hell," and "naked before him" is echoed in the expression "hath no covering." So in the succeeding verse we find "north" corresponding with "earth," and "empty space" corresponding with "nothing." As the

literal meaning of על is not "over," but "on," we may translate the sentence thus—

"He stretcheth out the north on '*the empty place*,'
And hangeth the earth upon nothing."

The other passage is in the sixth chapter of Job, at the eighteenth verse :—

15 My brethren have dealt deceitfully as a brook, and as the stream of brooks they pass away ;

16 Which are blackish by reason of the ice, and wherein the snow is hid.

17 What time they wax warm, they vanish : when it is hot, they are consumed out of their place.

18 The paths of their way are turned aside ; they go to "*nothing*," and perish.

The words here translated, "they go to nothing and perish," are יֵאָבְדוּ בַּתַּחַת וַיֵּאָבְדוּ, but this is not a literal translation. The literal meaning of יֵאָבְדוּ is not "they go," but "they ascend," or "go up." Again, the literal meaning of בַּתַּחַת is not "to," but "in." And lastly, the literal meaning of יֵאָבְדוּ is not "they perish," but "they are lost," or "they go astray."

This translation is evidently more expressive of the idea of the whole passage. Job is comparing the inconstancy of his friends to the brooks in the desert, which, when they are dried up by the heat, disappoint the troops of Tema, who expected to quench their thirst when they came to them.

17 What time they (the brooks) wax warm, they vanish : when it is hot, they are consumed out of their place.

18 The paths of their way (the brooks) are turned aside ; they ascend in "empty space," and they are lost.

19 The troops of Tema looked, the companies of Sheba waited for them.

20 They were confounded because they had hoped ; they came thither, and were ashamed.

Laplace himself could scarcely have desired a more accurate description of the primitive nebulous matter of which he believed the sidereal heavens to have been originally composed—a waste, a wilderness, confusion, empty space, nothing. These are the expressions adopted by the translators of the Bible to express the meaning of the Hebrew word in other passages; we accept them all as a very good translation of the word in Genesis.

The word *בְּרֵא* which is translated “void,” cannot be so accurately defined by means of contexts, but as it comes from the Arabic *بَرَاءَ*, which means “empty,” our own translation could scarcely be improved.

The word *תְּהוֹם*, translated “deep,” cannot be translated otherwise; and in conjunction with *מַיִם*, “the waters,” would seem to imply that the original chaos was a liquid, and not a gaseous substance; more especially as the words *עַל-פְּנֵי*, “on the face of,” occur in connexion with both. But to this it may be answered, that *עַל-פְּנֵי* does not necessarily mean “on the surface of,” for in the 20th verse it is used to express, not “on the surface of,” but “in the midst of,” as where fowls fly in the air.

“Fowl that may fly above the earth *in the open* firmament of heaven.”

The same words are here used, and the translators have considered it more consistent with the true meaning of the expression to translate it as expressing openness; so that if we apply the authorised translation of the 20th verse to the same words in the second verse, we should have it thus:—

“And the earth was empty space and void, and darkness was *in the open* deep, and the Spirit of God moved *in the open* waters.”

Another objection appears in the use of the word

"waters," which could scarcely be applied to a gaseous substance, except in a secondary sense; and it must be acknowledged, that if science and the context forbade it, we should not be warranted in departing from the common signification of the word. But the context does not forbid it, for whichever way we interpret the passage, we are forced to attach to the word "waters" in the sixth and seventh verses the idea of a gaseous substance.

6 And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters.

7 And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament : and it was so.

If the waters above the firmament mean the clouds, then the word "waters" must be applied to a gaseous substance, and if the firmament was created *in the midst* of the waters, why may not the waters *under* the firmament be gaseous as well as the waters *above* the firmament ?

The creation of the firmament recorded in these verses is scarcely capable of any interpretation except upon the nebular theory, for the word רָקִיעַ, translated "*firmament*," signifies an "expanse" or "stretching out." The English word *firmament* is a Latinism singularly inappropriate, intended to express the idea of a crystalline vault so firm as to be a permanent barrier against the waters above. The science of astronomy has dissipated this notion, by letting us know that the waters above the heavens are the stars, and the stars only ; and if in the second day's work God created this expanse to make a division which did not exist before, it may be truly said that this expanse was created *in the midst* of the waters. A further proof that this expanse is the space between the earth and the stars will be found in the description of the fourth day's work,

where it is said that God placed the sun and moon in the expanse which He had created on the second day.

Some have supposed that the expanse is nothing else than the *atmosphere* that separates the aqueous vapours, or clouds, from the earth. Not to speak of the inaccuracy of representing any separation of the kind to exist (for the aqueous vapours are greatest near the surface of the earth), we find it impossible to apply the words of the sixth verse to the creation of a mere atmosphere. If the waters of the chaos really meant the substance of the earth, and not the substance of the solar system, or even of the universe, then the command that an expanse should be formed in the midst of these waters would mean, that the earth was to be divided in the midst, and that a heaven was to be formed there. And when, in obedience to this command, an expanse did take place in the midst of the world, the waters above would be separated from the waters below; and the sun, and the moon, and the stars would be placed between them in the expanse (see verse 17). This, of course, carries its own refutation.

The work of the third day consisted in the appearance of dry land emerging from the waters, and the immediate growth of vegetation on its surface. This is not necessarily a Wernerian account of creation, for, supposing that a red-hot mass, with a gigantic atmosphere, was the product of the primitive combustion that gave the earth its present substance, the pressure of so enormous a weight of gaseous matter would produce a deposit of water on the surface of the planet long before the crust could be broken by contraction; for that could not take place for some time, until, by cooling, a considerable thick-

ness of crust had been produced. When that did take place, the shallow ocean, at that time universally spread over the earth, would only then begin to recede from the low mountain ridges which would rise to form the back bone, as it were, of each of the fractures.

The expression that we find here used to indicate the creation of the plants and trees would lead us to suppose that they were not produced by miraculous interposition, as was the case with man, but according to some law at present unknown to us.

The work of the fourth day has always been a difficulty with Biblical geologists and astronomers. The importance of the sun, as compared with the earth, is so striking, that instead of the earth with its vegetation being created first, we should expect the central luminary to be the first-born of the system; and accordingly many have contended that the sidereal heavens, with the sun and the moon, were created on the first day, but became visible for the first time only on the fourth day. This interpretation is entitled to the more weight, as the style of the narrative being apocalyptic, it is a description of what a spectator would witness if he had been present; or rather it is the inspired language of a "seer" who, in vision, has the successive scenes passing before him. We may be assured of this, however, that it was no astronomical or geological blunder that was committed in placing the work of the fourth day after that of the third. Our knowledge of the subject is as yet far too limited to allow us to do more than study the subject with humble attention. It would be a presumptuous argument to plead our ignorance in justification of unbelief. We might even, with certainty, predict that in some future genera-

tion this very difficulty, which seems so exceptional, will be regarded as one of the most wonderful proofs that Moses' narrative was not the product of a spurious philosophy, but was dictated by God himself.

In the meantime we may observe that, if in accordance with our chemical understanding of water and earth, the atmosphere was at one time burdened with the entire mass of the ocean in a state of aqueous vapour; and if, moreover, the sun be continually increasing in its bulk and splendour; these two circumstances, taken together, would sufficiently account for all that is stated by Moses on the subject. If some 30,000,000 of years ago the sun had only one-half of its present diameter, and only one quarter of its light; and if, at that period, the atmosphere of our planet resembled the present supposed atmosphere of Jupiter, in being several thousands of miles deep, and varying in its density and temperature to a degree such as we can scarcely understand; it is evident that, although by the rotation of the earth on its axis there would be a succession of light and darkness over its surface, still the sun, as we know it now, did not then exist, and could not have given any indication of its presence in any visible form. It could only be at a period long subsequent, when the sun had attained a magnitude somewhat approaching to its present size, and when the atmosphere had considerably decreased in density and increased in transparency, that the sun, moon, and stars would become visible at the surface of the earth; and then it might be said, in the language of inspiration, that they would rule the day and the night, and be for signs, and for seasons, and for days, and for years.

The work of the fifth and sixth days will not present

any difficulty to those who are prepared to read them in the light suggested in the previous chapter. On the contrary, they present to us features of magnificent simplicity and truth. There is the creation of fishes and fowls on the fifth day, and of beasts and other viviparous animals on the sixth, indicating the grand principle of progressive creation : first, the oviparous, typical of a lower grade of animal life ; and after them the viviparous, which represent the highest. Not that all the oviparous animals were created before the viviparous ; it is the general principle of progression that is symbolised. A detailed account of the various creations, and the laws which regulated their succession and distribution, would have been altogether out of place in the Mosaic history, because it would have been quite unintelligible to the general reader of the Bible, as well as calculated to interfere with the progress of natural science. The dramatic form alone was fitted to record so complicated a history, in the same way as the parabolic form is best suited to convey doctrinal and practical instruction to those whose minds are not prepared to receive it otherwise. In the dramatic form it is necessary to symbolise whole clusters of events by means of simple and characteristic incidents, and it is in this light that we are to look upon the record of the fifth and sixth days' work of creation. The doctrine of progression is indicated by representing the creation of oviparous animals as the work of the fifth day, and viviparous animals of the sixth ; and the grand doctrine of the miraculous nature of man's creation is indicated by the sea and the earth being *bidden* to bring forth the plants, the fishes, the birds, and the beasts of our planet, whereas the creation of man is represented as the

result of Divine consultation, and the work of God. "Adam was the son of God" (Luke iii. 38).

Notwithstanding the ingenuity of the views propounded by the author of the "Vestiges of Creation," who would make the polypus the progenitor of man, we have no indication in nature of any looseness of type, or *gradual* transformation of species. At the same time, it is by no means discordant with the analogies of nature, to suppose it quite possible that the successive creations of the pre-Adamite world were not the products of miraculous power, but the natural results of the operation of some great law, of the nature of which we are at present ignorant, and of which we cannot perhaps form even a conception. It is a great mistake to suppose that the operation of what we call natural laws is less indicative of Divine agency than miraculous interference. They are spoken of as being *instituted* by God, as if, after their institution, He left them to carry on the work that He had begun. They are no more institutions than is an author's style of writing, or a painter's style of art: the natural laws are nothing more than God's *style* and manner of administration in physical government. It is the infinite justice, and minuteness, and harmony that suggest the idea of law. Had there been caprice, or irregularity, or inaccuracy,—had miscalculation produced failure and rendered direct interference necessary to obtain the desired effect,—had there been zeal observable at one time, followed by a time of neglect, mankind would have instantly recognised an intelligent and a designing cause; but it is the steady, forbearing, temperate, continuous, never-wearyed, never-ending regularity of God's physical administration, that has given rise to the atheist's folly,

whereas it is that in which he ought to have recognised most distinctly the hand of a present God.

Our recognition, therefore, of the existence, and wisdom, and power of the Creator, ought not to be drawn so much from miraculous interferences, as from the normal administration which evolves, not capriciously, but by law, such magnificent results, without resorting to supplementary or corrective miracles. The Mosaic narrative rather encourages than otherwise the idea of a normal origin of all the lower animals, as well as of vegetation. "Let the sea bring forth," and "Let the earth bring forth," are the phrases which are used on these occasions; and if we be permitted, without being subjected to the charge of infidelity, to discover in the works of the first and second days of creation the action of natural laws, there can be no particular reason why we should deny the *possibility* of a similar explanation of the work of the days that follow. But what it becomes us particularly to notice is this, that in the account of the creation of man no such phrases occur; neither sea nor earth are intrusted with his creation, but God said, "Let *us* make man in our image, after our likeness. So God created man in his own image; male and female created he them." As the incarnation of the second person of the Trinity was an abnormal and miraculous generation, as distinguished from the normal and natural generation of other men; so the creation of Adam and Eve bears the same relation in an inferior degree to the creation of the lower animals that preceded them. The materials indeed were the same, for the earth brought forth of its own substance the cattle and beasts of the field; but the dust of the ground that supplied Adam with a body was fashioned by God himself, and the spirit that animated

it was the breath of his Creator. This testimony is in entire harmony with science—man appears upon the world without any connecting link between him and the lower animals. In physical structure he excels every other organism—in intellectual and moral endowments he stands entirely alone. The mere fact that the structure and functions of his body resemble those of the other animals does not prove a common origin, further than that they are the work of the same author. Types of form are not the result of laws, but the laws are the result of types.

Before closing this chapter, it may be desirable to say a few words regarding the supposed difficulty of representing the six days of creation as an indefinitely long period of time. We have been referred to other passages of Scripture, in which the word day must have a more extended signification than twenty-four hours ; but even this is not necessary as a concession—for an objector to this interpretation might be asked whether he would be disposed to acknowledge its force, *if it were true*, in proving its possibility here. If he does admit so much, he admits the entire argument. It is not necessary that an exceptional use of any word should be found more than once in the Bible, to warrant its propriety ; and in this case the fact is so obvious, that though there were no other instance of such a use of the word in the whole Bible, this one is sufficient to establish it. The evidence of a particular meaning in any one place may be so conclusive, as to make it independent of all other passages ; and if the *word* of God would be sufficient to prove the meaning, why should not the *works* of God be equally admissible ? But if it be asserted, that such a use of the word in other passages would not be sufficient to justify it here, then

we must examine upon what ground so bold a proposition is maintained.

We are told in reply, that the place which it occupies in the fourth commandment requires that its meaning should be strictly confined to a period of twenty-four hours: "Six days shalt thou labour and do all thy work; but the seventh is the Sabbath of the Lord thy God, &c. For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day, wherefore the Lord blessed the Sabbath-day, and hallowed it."

But they who rest an argument on this, mistake the nature of the reason assigned in the commandment. The parallel is drawn not between God's days and our days, but between the proportions of work and rest on the part of God, and on the part of man. The spirit of the commandment is found not in the word "*days*," but in the word "*six*." The sabbatic year and the jubilee found their analogies in the work of creation, as well as the Sabbath-day. Twenty-four hours is man's day, twelve months is the land's day, a thousand years may be God's day. It would even appear from a passage in the Hebrews that God's Sabbath is not less than seven thousand years at the very least, for it is into that rest that his saints are to enter.

3 For we which have believed do enter into rest; as he said, As I have sworn in my wrath, if they shall enter into my rest: although the works were finished from the foundation of the world.

4 For he spake in a certain place of the seventh day on this wise, And God did rest the seventh day from all his works.

5 And in this place again, If they shall enter into my rest (*κατάπαυσίν*).

9 There remaineth therefore a rest (*σαββατισμὸς*) to the people of God.—Heb. iv. 3-9.

But without insisting on this, the very nature and

style of the Mosaic narrative accord with such an interpretation. Its remarkable similarity to the Apocalypse of St John has already been noticed, and in that Scripture the term "day" does not necessarily imply only a period of twenty-four hours, but rather twelve months. If, therefore, science shall indicate that the six days of creation, counting from the first creation of light to the formation of Eve, extended over a period of many thousands of years, there is nothing to prevent us from assigning to them that interpretation.

PART II.—THE ANGELS.

CHAPTER XV.

HUMAN NATURE, THE HIGHEST TYPE IN CREATION.

WHEN Newton observed the apple falling from the tree in his garden, and was led to study how falling apples and revolving planets might obey the same universal law of gravitation, he gave us a key to all the subsequent discoveries of astronomy. That key consists in using things that are known as guides to the things that are not known ; presuming, in the meantime, that there is a similarity of substance, and an identity of law throughout creation, *in so far as there is no evidence to the contrary.*

The human mind is always disposed to allow the imagination to revel in the mere possibilities of things unknown, and to use the knowledge we possess, not as a guide, but as a beacon—as if the things which we see and know were not *specimens* of the things unseen, but *contrasts*. We can look back to the time when the unknown regions of the earth were peopled with imaginary beings—fauns and syrens, centaurs and sphinxes, harpies and cyclops, all of them presenting new *types* of structure with *developments* entirely old ; and had the ancient

geographers been told that the human form, in every part of the world, was the same, having two eyes, two arms, and two legs, with neither wings nor tails, they would probably have repudiated the idea as by far too commonplace, and regarded it as quite unworthy of the resources of creative power.

The grand characteristic feature of God's work in creation appears to be *unity of type with variety of development*. Mankind, in speculating upon what is unknown, have always been inclined to reverse the principle, by imagining a variety of types and a unity of development; and as geographical discovery has proved the fictitious nature of these imaginary beings, so may we expect that, whenever the vail shall be drawn which at present hides celestial objects from our view, we shall find a wonderful and beautiful unity reigning throughout all God's works, and that the endless varieties, both of animal and vegetable structure, which have their dwelling in the sky, circle round the same types of organisation, many, if not most, of which we see around us every day.

The more enlarged our knowledge of God's works, the more do we gravitate towards this grand conclusion; and although Scripture, at first sight, may appear to introduce us to a system, or systems, of existence whose peculiarity is innovation and unsteadiness—innovation upon types, and unsteadiness of law—nothing can be more false than such an impression. In ages past it has been the atmosphere in which all sober thinkers have breathed; and although it presents before us a series of phenomena beyond the range of our present vision, and although these phenomena have been distorted by the wild fancies of bold but wayward imaginations, it will be found that when they are studied with a child-like and unpre-

judiced simplicity, they will startle the philosopher, not by their discords, but by their harmonies with science.

Whenever we break loose from the teachings of induction, even science may be yoked to the chariot of fancy to help her in her flight. For example, when she demands that every orb must be inhabited, science offers to supply her with a population. If it be the planet Mercury or the sun, we are either introduced to inhabitants acclimated to the fire, or we are told that the sun is a "body of ice" and the "seat of darkness," because the sun's rays are effective only when they act upon a calorific medium; as for the regions of Mercury they may be as frosty as we suppose them hot. If it be for Neptune, on the other hand, that a population is required, the difficulty is not so great but that it may be overcome; and teeming races are accordingly provided, the lenses of whose telescopes are made of ice of the purest water, whose barometers are filled with metallic hydrogen instead of mercury, and who launch their contending navies upon oceans of carbonic acid.

With such a disposition, every attribute of existence may be made the basis upon which to found a difference. The inhabitants of Sirius, according to one author, are nine miles in height; another hazards the opinion that in other worlds, instead of souls being lodged in bodies, the bodies are lodged in external souls. One popular writer propounds a hypothesis according to which two or three universes exist in the same space, and yet each is unconscious of the other's existence. A second indulges the thought that within a point so small as to elude all the powers of the microscope, there may be another universe, the mechanism of whose worlds is filled with the evidences of a Creator's glory; while a third is inspired with the

imagination that there may be beings so immeasurably superior to man, that all the visible universe that presents itself to our eyes may be a microscopic object altogether invisible to their eyes; and the spaces between sun and sun, and between system and system, may be no greater to them than the distances between the pores in a grain of sand are to us.

There is no end to these imaginings, and it requires boldness rather than originality to excel in their production. The objection to them does not lie in their impossibility, for they are not impossible; it lies in their barrenness, and the impossibility of making any real progress by their means. Their effect upon the mind also is bad, for instead of enlarging the intellect, their tendency is to produce dissipation, and weaken the habit of modest and patient induction. How different is the language of Scripture, how sober its revelations, and yet how much more truly grand! In contrast to all this imaginative ex-patiation, it presents to us the human nature of Jesus as the connecting link by which we are related to all the intelligent inhabitants of the universe. The heathen mythologies and the superstitions of the different nations may tell us of gigantic creatures or diminutive elves: the Bible uniformly speaks of the whole family of God, both in heaven and in earth, as one; and when any, even the highest and the brightest that stands before His throne is introduced in Bible history, he is uniformly presented to us as a brother man.

Scripture, interpreted by science, will be found to teach that human nature is the very highest type of created intelligence; and we shall endeavour to shew that all the moral and intelligent creatures that people the universe, belong exclusively to the human species. The

physical constitution of men, angels, and devils is represented in Scripture as in every respect identical, their apparently different natures being nothing more than the different states of development of which it is susceptible.

When we are informed that man was made after the image of God, this almost amounts to a declaration that his was the highest style of created being, and that no higher type or pattern could ever appear. The image of God must be a perfect image—as perfect as a mere image can be. The original of which he is a copy is the highest possible, and the artist being God himself, we may be sure that it was executed in the very highest style.

Not that Adam was the only creature of his kind, or that he alone, in his own person, illustrated all the features which were copied from the Divine Original,—he was but one of a class, and one who, had he been left in his fallen state, would have failed to develop that image in all its completeness. It will be shewn, in our future chapters, that we must look to the resurrection state of the redeemed, and to the fully developed state of the angels, as that which was in the mind of the Creator when he said, “Let us make man in our image.”

It is true that it is the spirit, or rather the mind, that is created in God's image, and not the body; but this does not affect the conclusion, for it is the result and not the means that constitutes the likeness. We think, and God thinks—we observe, and God observes—we feel, and God feels; but in all this there is an infinite difference, for God thinks and observes and feels absolutely and essentially, and in a manner altogether different from that in which our faculties act,—it is only in the result that there is any resemblance. It is of no importance, therefore, whether we say that it is the body or the spirit

that is like to God, because, strictly speaking, it is neither in the one nor in the other that the likeness appears, but only in the result of both. It is not the spirit alone, therefore, that bears the image of God—it is the body and the spirit combined. The crime of murder is represented in Scripture as exceedingly heinous, “because man was made in the image of God.”

If we set aside the symbolic creatures seen in visions,* or represented in the sculpture of the sanctuary, we shall find that Scripture affords no warrant for the supposition that angels have any form different from that of man. It is true that poets and painters are in the habit of attaching a couple of wings to the shoulders of angels, and that cherubs are usually represented with the head of a child carried upon the wings of a dove; but we shall look in vain for any Scripture authority for such representations. The angels are represented as the highest created intelligences in the universe, and there is none of them more honoured than Gabriel, who stood in the presence of God, and was at least on four different occasions entrusted with messages to earth,—twice in the Old Testament and twice in the New Testament history,—and yet the form of

* The cherubim mentioned in the Old Testament, and the four beasts mentioned in the Revelation of St John (chap. iv. 6), appear to represent the Church in its different states and characters: “The first beast was like a LION (*representing the Church in Apostolic times, and of an Apostolic character*), the second beast like a CALF (*representing the Church of the dark ages, and as a victim in the times of Pagan and Papal persecution*), the third beast had a face as a MAN (*representing the Church in Reformation times, at the head of civilisation and philosophy*), and the fourth beast was like a FLYING EAGLE” (*representing the Church triumphant*). All these are represented as being in the midst of the throne, and round about the throne; and the Lamb stood in the midst of the throne and of the four beasts; and the four beasts joined in the song, saying, “Thou hast redeemed us to God by thy blood.”

Gabriel was a human form—he is even called "*the man Gabriel*."

But if we had no other evidence of the supremacy of the human type of being, the fact of the incarnation of the Son of God would be sufficient. If, in the human form, the Son of God could assume the likeness of a servant, and humble Himself even to death, He could, in the same human nature, assume the highest glory and honour. If, when clothed in the natural body, he was made a little lower than the angels, when He was clothed with his spiritual body He was still a man, but He was elevated to the right hand of the Majesty of Heaven, far above all principality, and power, and might, and dominion, and every name that is named not only in this world but in that which is to come. If the human nature had not been the very highest, may we not say it with reverence, that there would have been an evident impropriety in investing the great King of the universe with a nature inferior to that of those whose knees were to be bent in homage, and whose tongues were to confess His praise? Surely, among the angels that bow before Him, there cannot be a nature superior to His own.

To some it may be an objection, that the structure of the human body is so like that of the lower animals. Reaching downwards from the dog and the fish, among the vertebrate animals, the same type of being descends to the lowest form of mollusc, in which a tiny thread of nervous matter claims kindred with the human brain. It may seem strange to some that the highest type of being should be so like a beast. But, in truth, this is not a valid objection;—it is rather a confirmation of the doctrine. It is because they are all of them the hand-work of the same Artist that they are so much alike.

That which He does is best, not only in its end, but in its means : and if we find that, from the lowest to the highest, there is but one principle and plan, this proves that there are not two which are equally good. Why, then, should the Creator adopt an inferior method even for His lowest creations ? If we find that the same type of being is capable of such infinite diversity of development and pattern, from the simple polyp up to the human form, why should we suppose that, after conducting us thus far, it should be imperfect at the end, and that another and altogether different type should be necessary to reach up only a little higher ?

Some in the spirit of humility have ascribed to the angels a nature immeasurably superior to that of man, even in his glorified state ; but this is a humility which gives no glory to God, and no honour to the Lord Jesus Christ, because it is based not upon any revealed glory that belongs to the angels, but upon the supposed inferiority of human nature. Alas ! it is but too true that we have so defiled and degraded our bodies and spirits, that it may seem presumptuous for such as we are to claim kindred with the angels. But that is our work, not God's ; and the enormity of our offence consists in this, that such as we should have ever sinned. Even now the human body, soul, and spirit constitute a very miracle of beauty and grandeur, fallen as they are ; but we shall be better able to admire its glory when the manifestation of the sons of God shall be complete, and when God himself will look upon us, and "rejoice over us with joy" (Zeph. iii. 17), and the very Son of God will not be ashamed to call us brethren (Heb. ii. 11).

CHAPTER XVI.

THE ANGELS OF GOD EMBODIED SPIRITS.

It is generally supposed that the angels and devils, so frequently mentioned in Scripture history, are spirits belonging to a superior order of creation ; that they were at first alike in nature and character ; but that, in consequence of sin, the devils fell from their original righteousness, and have now become malignant in their dispositions towards man, and rebellious in their spirit towards God.

That the devils were originally like the holy angels, but are now fallen from their state of innocence, seems very evident, not only from the analogy of Adam and his fall (for God at first made all things very good), but from the representations of Scripture. John, for example, informs us that the devil was created in the truth, but that he did not abide in it (John viii. 44) ; Peter also tells us that they were originally angels, but he calls them the angels that sinned (2 Pet. ii. 4) ; and Jude speaks of them as the angels that kept not their first estate (Jude 6).

If, then, the angels and the devils were *originally* alike, not only in character but in constitution, nothing can be more certain than that they are *now* entirely unlike one another. Not only is their moral nature different, but their physical constitution may be shewn to be totally

dissimilar. Throughout the whole of Scripture, we find the devils spoken of and represented as invisible agencies, capable of influencing and even inhabiting the bodies of others, but never assuming any corporeal shape or bodily appearance of their own. On the other hand, we as uniformly find the angels spoken of and represented as appearing in bodies of their own, walking, speaking, eating, and acting, but never entering or taking possession of the bodies of others. In other words, the angels are represented as *embodied* spirits, the devils as *disembodied* spirits.

If, then, the angels and devils were originally alike, and are now totally different, the question arises, Which of the two classes has undergone a change? Were the angels originally like the devils, disembodied or unembodied spirits, but now become possessed of bodies, as we find them usually represented in Scripture? Or were the devils once possessed of bodies like the angels, but now are they changed so as to be dispossessed of their bodies, and to become disembodied spirits, as they are represented in Scripture? We have little difficulty in adopting the latter as the more probable alternative, for if it be a universal law of God's moral government that the wages of sin is death, we cannot hesitate to conclude that the change has taken place upon the devils and not upon the holy angels. Originally they were like the angels, possessed of bodies, in which they walked, and talked, and ate, and acted like them; but when they sinned they became mortal like Adam, their bodies died, and their spirits descended into hell (2 Pet. ii. 4), called also the deep (Luke viii. 31), from which it appears they are sometimes permitted for a season to come forth.

The angels who appeared to Abraham in Mamre, and to Lot in Sodom, were possessed of bodies so closely

resembling those of ordinary men, that Scripture does not hesitate to call them by that name.

Abraham lifted up his eyes and looked, and, lo, three men stood by him (Gen. xviii. 2).

And the men rose up from thence, and looked toward Sodom: and Abraham went with them, to bring them on the way (Gen. xviii. 16).

But the men put forth their hand, and pulled Lot into the house to them (Gen. xix. 10).

And the men said unto Lot, Hast thou here any besides? &c. (Gen. xix. 12).

And while he lingered, the men laid hold upon his hand, and upon the hand of his wife, and upon the hand of his two daughters (Gen. xix. 16).

They had all the appearance and seemed to possess all the faculties of men. Abraham understood that they required rest and refreshment; and Lot certainly entertained no doubt of their being only men, else he would not have been so much afraid of any violence being offered to them. Sight, hearing, and touch, all decidedly testified to the materiality of their bodies; and if any doubt had arisen on that point, the fact of their eating of the butter, the milk, and the flesh which Abraham set before them, and the unleavened bread provided by Lot, was quite conclusive. Their conduct in the house of Lot—their preparations for lying down—their pulling Lot into the house, and shutting the door—one laying hold of the hands of Lot and his wife, the other of those of his two daughters, and forcibly bringing them out of the city—all unite in testifying that they were not naked spirits, as devils probably are, but that they were possessed of material though spiritual bodies.

We have another interesting account of the appearance of an angel in the time of the judges, as described by the wife of Manoah (Judges xiii. 6):—

6 A man of God came unto me, and his countenance was like the

countenance of an angel of God, very terrible: but I asked him not whence he was, neither told he me his name.

8 Then Mancoah entreated the Lord, and said, O my Lord, let the man of God which thou didst send come again unto us, and teach us what we shall do unto the child that shall be born.

9 And God hearkened to the voice of Mancoah; and the angel of God came again unto the woman as she sat in the field: but Mancoah her husband was not with her.

10 And the woman made haste, and ran, and shewed her husband, and said unto him, Behold, the man hath appeared unto me, that came unto me the other day.

11 And Mancoah arose, and went after his wife, and came to the man, and said unto him, Art thou the man that spakest unto the woman? And he said, I am.

15 And Mancoah said unto the angel of the Lord, I pray thee, let us detain thee, until we shall have made ready a kid for thee.

16 And the angel of the Lord said unto Mancoah, Though thou detain me, I will not eat of thy bread; and if thou wilt offer a burnt-offering, thou must offer it unto the Lord: for Mancoah knew not that he was an angel of the Lord.

19 So Mancoah took a kid with a meat-offering, and offered it upon a rock unto the Lord: and the angel did wondrously; and Mancoah and his wife looked on.

20 For it came to pass, when the flame went up toward heaven from off the altar, that the angel of the Lord ascended in the flame of the altar; and Mancoah and his wife looked on it, and fell on their faces to the ground.

21 (But the angel of the Lord did no more appear to Mancoah and to his wife.) Then Mancoah knew that he was an angel of the Lord.

We gather from this narrative, that although the countenance of the angel was so peculiar as to arrest the attention of the woman, still neither she nor her husband appear to have had the slightest suspicion that he was not a human being. They were anxious to entertain him hospitably, by making ready a kid, that he might eat of the flesh with bread. It may also be remarked that the woman recognised the angel when he came the second time; which shews, that whatever were the features which she saw the first time, were the same features which she saw again.

The angel that appeared to Gideon (Judg. vi. 11), in like manner, was evidently mistaken for a merely human prophet, and the entertainment which Gideon provided—the flesh of the kid and the unleavened cakes which he put in the basket, and the broth which he brought in the pot and presented to the angel—was evidently intended, not for a sacrifice, but for a repast. When, therefore, the angel put forth the staff which was in his hand, and touched the flesh and the unleavened cakes, and when the fire came out from the rock and consumed them, and the angel departed out of his sight, probably, as in the other case, in the flame or smoke of the offering, then and not sooner Gideon perceived that he was an angel of the Lord, and was alarmed lest, in consequence, he should die.

It is an interesting circumstance that the angel Gabriel, on four different occasions, is the subject of Scripture narrative—twice in the Old Testament, and twice in the New. His first appearance was to Daniel, and is thus recorded (Dan. viii.) :—

15 Behold, there stood before me as the appearance of a man.

16 And I heard a man's voice between the banks of Ulai, which called, and said, Gabriel, make this man to understand the vision.

17 So he came near where I stood : and when he came, I was afraid, and fell upon my face : but he said unto me, Understand, O son of man ; for at the time of the end shall be the vision.

His second appearance is thus recorded (Dan. ix.) :—

21 Whiles I was speaking in prayer, even the man Gabriel, whom I had seen in the vision at the beginning, being caused to fly swiftly, touched me about the time of the evening oblation.

The circumstances under which both of these appearances took place, prevented any mistake on the part of Daniel, or any surprise ; and yet, knowing that he was an angel, and that he was sent on a special mission from heaven to earth, he speaks of him notwithstanding

as a man, and calls him by that name—"the *man* Gabriel, whom I had seen in the vision at the beginning." We also notice here the same recognition of his face and person by Daniel, as in the case of Manoa's wife, evidently leading us to infer that, as one man's countenance and person differ from those of every other, so do the angels' countenances and persons differ from one another. The countenance of the man Gabriel was evidently radiant with benevolence, whereas the man that appeared to Manoa's wife had a countenance which was very terrible.

The third recorded visit of this very same angel took place five centuries after, when Zacharias was engaged in offering incense at the altar in the temple (Luke i.) :—

11 And there appeared unto him an angel of the Lord standing on the right side of the altar of incense.

19 And the angel answering, said unto him, I am Gabriel, that stand in the presence of God; and am sent to speak unto thee, and to shew thee these glad tidings.

His fourth recorded visit is to the Virgin Mary, six months after (Luke i.) :—

26 And in the sixth month the angel Gabriel was sent from God unto a city of Galilee, named Nazareth,

27 To a virgin espoused to a man, whose name was Joseph, of the house of David; and the virgin's name was Mary.

28 And the angel came in unto her, and said, Hail, thou that art highly favoured, the Lord is with thee: blessed art thou among women.

29 And when she saw him, she was troubled at his saying, and cast in her mind what manner of salutation this should be.

In this last appearance of Gabriel we may observe that, instead of "appearing" to Mary as he did to Zacharias, and, on the conclusion of the interview, "vanishing out of her sight," we are told that, when he received his commission, he was sent "unto a city of Galilee, named Nazareth," and when he was come to the city, the angel

"came in unto her." So also, in departing, it is said, "the angel departed from her."

This reminds us very much of the three angels who, though they "*appeared*" to Abraham in the plains of Mamre—"When he lifted up his eyes and looked, and, lo, three men *stood* by him"—on their departure did not "*disappear*." One of them remained in conversation with Abraham; the other two "turned their faces from thence, and *went* toward Sodom" (Gen. xviii. 23). "And there *came* two angels to Sodom at even; and Lot sat in the gate of Sodom: and Lot, seeing them, rose up to *meet* them" (Gen. xix. 1).

How interesting would it be to know what were the features of these different angels; which of the different races of the human family they most resembled; what appeared to be their ages; what the tones of their voices; and whether, had Daniel been present in the temple with Zacharias, he would have perceived any change in the features or the person of Gabriel, during the five hundred years that had elapsed since his first recorded visit to our earth! We have no means of knowing more than this, that his appearance was that of a man; but we have an authentic record of his words on all of these occasions, and we almost fancy that we can perceive a style of speech and mode of thought peculiar to himself: "Fear not, Zacharias: for thy prayer is heard; and thy wife Elisabeth shall bear thee a son, and thou shalt call his name John"—such were his words to the aged priest; to the young virgin his address was almost identical: "Fear not, Mary; for thou hast found favour with God: and, behold, thou shalt conceive in thy womb, and bring forth a son, and shalt call his name Jesus." We can even perceive some general resemblance in his mode of addressing Daniel,

five hundred years before : " O Daniel, I am come to shew thee, for thou art greatly beloved ;" and to Mary he says, " Hail, thou that art highly favoured, the Lord is with thee : blessed art thou among women."*

From all these narratives combined, we infer, with a certainty not frequently accorded to philosophical deductions drawn from Scripture, that the angels are spirits possessed of real bodies. The argument is an important one, because it lies at the root of other truths besides this. It opens up the question of the validity of evidence as presented to the senses ; and as it is upon this evidence that the truth of Christianity is founded, we must not lightly set aside its testimony. We might even go the length of saying, that our belief in the resurrection of Christ is dependent on the same kind of evidence by which we prove the materiality of the bodies of angels. If the angels were unembodied spirits, why might not Christ be so also after His resurrection ? " Handle me, and see," he says ; " for a spirit hath not flesh and bones, as ye see me have. And when He had thus spoken, He shewed them His hands and His feet. And while they yet believed not for joy, and wondered, He said unto them Have ye here any meat ? and they gave Him a piece of a broiled fish, and of an honey-comb. And He took it, and did eat before them " (Luke xxiv. 39-43). The very circumstance that our Lord used this argument to prove that he was possessed of a body composed of flesh and bones, and appealed to the evidence of their senses as decisive on the subject, is strong security that the argument, when applied to the angels, is equally legitimate and conclusive. When the two angels laid hold of Lot, and his wife, and his two daughters by the hand, they handled them, and

* See Appendix E.

saw that they were not spirits, but had flesh and bones ; but if even this had not been enough, we find the sealing evidence, which was made use of by Christ, and than which nothing could be stronger, was actually provided in the case of the angels. The three angels in the plains of Mamre, and the two angels in Sodom, did eat before those to whom they appeared.

Abraham took butter and milk, and the calf which he had dressed, and set it before them ; and he stood by them under the tree, **AND THEY DID EAT** (Gen xviii. 8).

And Lot pressed upon them greatly ; and they turned in unto him, and entered into his house : and he made them a feast, and did bake unleavened bread, **AND THEY DID EAT** (Gen. xix. 3).

Neither have we any reason to doubt that, in the case both of the angels at Mamre and the angels in Sodom, the hospitality of Abraham and Lot was exercised in providing water for the washing of their feet. "Let a little water, I pray you (said Abraham), be fetched, and wash your feet, and rest yourselves under the tree" (Gen. xviii. 4). "Turn in, I pray you (said Lot), into your servant's house, and tarry all night, and wash your feet" (Gen. xix. 2). It is true that we are not informed that in either case they did wash their feet, yet there seems no reason to doubt that this universal custom was complied with.

An objection may be taken to the conclusion we have come to, on the ground that one of the three angels that appeared in Mamre was God himself, or rather the Son of God, and that if the eating of flesh, and drinking of milk, was proof that the angels had bodies, so would it prove that the Son of God was incarnate before the days of Herod.

We allow that this is a difficulty, but we deny that it

is an objection. If the third angel was seen, and handled, and did eat in the presence of Abraham, we have no hesitation in saying that he had a body, but the question would then arise, Was this angel really the Son of God? The mere circumstance of His speaking the message to Abraham in the first person is not, under *any* circumstances, to be regarded as decisive on this point; more especially if the alternative be to cast suspicion upon the conclusiveness of the evidence that our Lord offered to prove that He had a body. We find the angel at Bochim doing the same (Judges ii. 1).

Another, and apparently a more formidable objection, presents itself in Ps. civ. 4, "Who maketh his angels spirits; his ministers a flaming fire;" or, as quoted by the author of the Epistle to the Hebrews from the Septuagint, "Who maketh his angels spirits, and his ministers a flame of fire" (Heb. i. 7). Again, in the 14th verse of the same chapter, "Are they not all ministering spirits, sent forth to minister for them who shall be heirs of salvation?"

Here it would appear, at first sight, as if we had an authoritative declaration that the angels are unembodied spirits.

Let us examine then the first of these passages, to discover whether its facts are in opposition to the materiality of the angels' bodies. It is as follows (Ps. civ. 2-4):—

2 Who coverest thyself with light as with a garment; who stretchest out the heavens like a curtain;

3 Who layeth the beams of his chambers in the waters; who maketh the clouds his chariots; who walketh upon the wings of the wind;

4 Who maketh his angels spirits; his ministers a flaming fire.

When we examine this passage in the original Hebrew, it will be found that its meaning is not that God makes His angels spirits, but that He makes His angels or

messengers the winds. It is well known that both in Hebrew and Greek the words here translated "angels" and "spirits," mean also "messengers" and "winds," and they must be so translated wherever the meaning of the passage requires it. In the present instance our authorised translation is inconsistent with the nature of the idea that the Psalmist is striving to convey. He is describing the majesty of God, and by a succession of magnificent figures shewing how the elements of nature are subject to His control, and made to minister to His glory:—

He makes His garments *the light*;

He makes His curtains *the heavens*;

He lays the beams of His chamber on *the waters*;

He walks on the *wings of the wind*;

He makes His angels or messengers *the winds*;

He makes His ministers a *flaming fire*.

When translated in this way, the words are most significant, and the ideas harmonious; but if, instead of saying that He makes His angels or messengers the winds, we say that He makes His angels spirits, it is not only difficult to attach any idea to the words, but it is impossible to harmonise them with the rest of the passage. The word translated "wind" in the third verse—"He walketh on the wings of the *wind*"—is the very same word (רוּחַ) that is used in the fourth verse, and there translated "spirit;" and there can be little doubt that if the quotation in the Epistle to the Hebrews had not influenced the translators in their rendering of the original passage, they would have translated it thus:—

4 Who maketh his messengers the winds, his ministers a flaming fire.

So far, then, as the passage in the Psalms is concerned, there is no difficulty; but did the author of the Epistle

to the Hebrews misunderstand or misapply it when he quoted it? Certainly not; on the contrary, the very nature of his argument proves that he rightly understood it, and it is only because we wrongly translate his quotation, as well as the original passage, that the force and point of his argument is lost. He is engaged in proving the superiority of the Eternal Son over the angels; and laying hold of the fact, which both the Jew and the Greek well knew, that in both languages the word angel means simply a messenger, he shews that their office, being only ministerial, places them on a level no higher than the elements of nature that are sometimes employed to perform their work. They are messengers of mercy and ministers of vengeance, but God can make the winds to perform the one duty, and flames of fire the other. In our present translation, "He maketh His angels spirits, and His ministers a flame of fire," we are utterly at a loss to perceive any force of argument. God is a spirit; and if the angels were made to partake of this spirituality of nature, instead of being humbled by the statement they would rather be exalted, by having ascribed to them a nature which, in one respect, resembles God himself.

It must be observed, however, that when translated into English, the passage in the Hebrews must necessarily suffer, in consequence of our word angel not being the same word which we always use for messenger. In Greek it is so, or nearly so. Thus, we read in Luke vii. 24, "And when the 'angels' of John were departed;" or in the ninth chapter and 52d verse, "Jesus sent 'angels' before his face; and they went, and entered into a village of the Samaritans, to make ready for him." It is this which gives a peculiarity to the passage in Hebrews, because the word *αγγελοι* is an exact translation of the

Hebrew מַלְאָכִים. Both words mean an angel and a messenger, as our word minister means both a servant and a clergyman; so that there is a singular appropriateness in the quotations when we remember this circumstance.

There remains, however, the third passage in Heb. i. 4; which, it must be acknowledged, is not so easily disposed of: "Are they not all ministering spirits, sent forth to minister for them who shall be heirs of salvation?"

There can be no doubt that if this had been the only statement regarding the angels, the presumption would have been that they are nothing more than spirits; nevertheless, it does not necessarily and logically imply that they are not possessed of spiritual bodies: the mere assertion that they are spirits, is consistent with either hypothesis. They may be embodied spirits, or unembodied spirits, or disembodied spirits. Logically they are not the less spirits because they have bodies, more especially if their bodies be spiritual bodies. For example, Paul, when contrasting the first and second Adam, says (1 Cor. xv. 45), "And so it is written, The first Adam was made a living soul, the last Adam was made a quickening spirit." We shall have occasion to examine this passage more particularly when we come to speak of the resurrection body; it is only necessary at present, to refer to it as proving that the angels may have bodies, notwithstanding that they are called spirits. When Paul speaks of Christ being a quickening spirit, he does not mean to imply that he had no body: for although had this been the only passage in Scripture on the subject, we should have been warranted in presuming that probably he was a spirit and had no body; yet, as we have abundance of proof in other passages that he had a body, composed of "flesh and bones," even after his resurrection, we cannot permit such a passage

as this to bear a meaning which would be inconsistent with other Scripture. We must, therefore, explain this passage in the Hebrews, consistently with the numerous other passages whose testimony it is impossible to misunderstand.

On the whole, therefore, we have every reason to believe that the angels are embodied spirits, and that though they may be possessed of qualities peculiar to spiritual bodies, they are not the less material, but, like Christ after His resurrection, possessed of flesh and bones, as he called the disciples to witness that he had.

CHAPTER XVII.

THE SPIRITUAL BODY.

All flesh is not the same flesh : but there is one kind of flesh of men, another flesh of beasts, another of fishes, and another of birds.

There is a natural body, and there is a spiritual body.

Howbeit that was not first which is spiritual, but that which is natural; and afterward that which is spiritual (1 Cor. xv. 39, 44, 46).

SUCH is the information given us by an inspired writer regarding the relations of the natural and the spiritual body. The whole passage (1 Cor. xv.) is worthy of a most careful examination: we have extracted three verses, which more distinctly bear a scientific value.

From them we are warranted in inferring, first, that the human body has two distinct modifications—the natural and the spiritual states; both of them normal, and yet so different, that our knowledge of the one gives us little help in understanding the qualities and functions of the other. We may also infer from the 46th verse that there is an order of development in the two states. The first, which is the natural (or soul) state, is capable of having the second, or spiritual state developed from it: the second, or spiritual state has also this peculiarity, that while it is incapable of originating either itself or the natural state, it is capable of being developed as a more advanced and more perfect mode of existence. These statements which we have quoted bear very much the character of scientific propositions.

Having ascertained that the spiritual body has a normal character, so that its functions are not to be regarded as miraculous, we turn to other parts of Scripture to ascertain what those functions are.

The resurrection body of Christ is the only *human* body, in its spiritual state, whose functions are exhibited to us in Scripture; but there are passages which link that nature, not only with the future resurrection bodies of the saints, but also with the spiritual bodies of the angels:—

But now is Christ risen from the dead, and become the first-fruits of them that slept (1 Cor. xv. 20).

And as we have borne the image of the earthy, we shall also bear the image of the heavenly (1 Cor. xv. 49).

Beloved, now are we the sons of God; and it doth not yet appear what we shall be: but we know that, when he shall appear, we shall be like him; for we shall see him as he is (1 John iii. 2).

For our conversation is in heaven; from whence also we look for the Saviour, the Lord Jesus Christ: who shall change our vile body, that it may be fashioned like unto his glorious body (Phil. iii. 20, 21).

These passages prove that Christ's spiritual body is a type and specimen of the bodies of the saints at the resurrection; the following passages prove that the bodies of the saints at the resurrection will be like the angels of God:—

For in the resurrection they neither marry, nor are given in marriage, but are as the angels of God in heaven (Matt. xxii. 30).

When they shall rise from the dead, they neither marry, nor are given in marriage; but are as the angels which are in heaven (Mark xii. 25).

The children of this world marry, and are given in marriage:

But they which shall be accounted worthy to obtain that world, and the resurrection from the dead, neither marry, nor are given in marriage:

Neither can they die any more: for they are equal unto the angels (*ισάγγελοι*); and are the children of God, being the children of the resurrection (Luke xx. 34-36).

This statement is profusely illustrated in Scripture his-

tory, where we will find a complete correspondence between the appearance and functions of the spiritual bodies of angels and the spiritual body of the Lord Jesus Christ.

1. *The spiritual body is a body possessing flesh and bones, capable of being seen, heard, and handled, and of assimilating both animal and vegetable food.*

Such, in the first place, was Christ's spiritual body, as appears from the following passage, to which allusion has already been made in a previous chapter :—" Behold my hands and my feet, that it is I myself: handle me, and see; for a spirit hath not flesh and bones, as ye see me have. And when he had thus spoken, he shewed them his hands and his feet. And while they yet believed not for joy, and wondered, he said unto them, Have ye here any meat? And they gave him a piece of a broiled fish, and of an honey-comb. And he took it, and did eat before them" (Luke xxiv. 39-43).

The appeal which Christ made to their bodily senses, and especially to their seeing Him eat before them, gives a validity to the testimony of the senses in all other cases where there is a doubt regarding the materiality of the bodies of angels, more especially if it be accompanied with the observation of the person eating. Two instances, therefore,—those of the three angels in Mamre, and the two angels in Sodom, eating the flesh of the kid with the unleavened bread, &c.,—form a complete counterpart to this passage in the life of Christ after His resurrection.

It will be observed that our Lord asserts the fact that His body had really flesh and bones, as its appearance indicated. He does not say blood also; but it is perhaps refining too much to suppose that the blood was not there. Paul, indeed, says that flesh and blood cannot

inherit the kingdom of God ; but when placed alongside of our Lord's assertion, that He had flesh and bones, we are forced to the conclusion that Paul meant not the flesh and blood of the spiritual body, but the flesh and blood of the mortal body, because he adds, "neither doth corruption inherit incorruption" (1 Cor. xv. 50).

2. The spiritual body is possessed of the power of rising from the ground in opposition to the force of gravitation, of existing in regions where there is little or no atmosphere, and passing with great rapidity from one star to another.

In regard to our Lord's resurrection body, we find this faculty exhibited at the time of his ascension from the Mount of Olives :—

So then, after the Lord had spoken unto them, he was received up into heaven, and sat on the right hand of God (Mark xvi. 19).

And he led them out as far as to Bethany ; and he lifted up his hands, and blessed them. And it came to pass, while he blessed them, he was parted from them, and carried up into heaven (Luke xxiv. 50, 51).

9 And when he had spoken these things, while they beheld, he was taken up ; and a cloud received him out of their sight.

10 And, while they looked stedfastly toward heaven as he went up, behold, two men stood by them in white apparel ;

11 Which also said, Ye men of Galilee, why stand ye gazing up into heaven ? this same Jesus, which is taken up from you into heaven, shall so come in like manner as ye have seen him go into heaven (Acts i.).

That the resurrection bodies of the saints will be possessed of this power is proved not only by the general promise of their likeness to Christ, but by direct statement :—

Then we which are alive and remain shall be caught up together with them in the clouds, to meet the Lord in the air (1 Thesa. iv. 17).

We are not to suppose, however, that this faculty of the spiritual body implies the absence of gravitation ; *

* See Appendix H.

for without gravitation we should not be able to walk, stand, or sit—all of which both Christ and the angels were able to do. How this faculty will be possessed, we have no means of knowing: it is one peculiar to the spiritual body; and, until we know something by experiment or experience of its nature, we need not attempt to speculate on the subject further than to know that the fact is certain.

That the angels are possessed of this faculty is proved by the very circumstance of their visiting the earth and returning from it. The angel that appeared to Manoah and his wife ascended in the flame of the altar, nearly in the same manner as our Lord ascended from the Mount of Olives (Judg. xiii. 20); and Gabriel being commanded to fly swiftly, arrived at the time of the evening sacrifice, on the day set apart by Daniel for humiliation and prayer (Dan. ix. 21).

3. *The spiritual body has the power of passing through solid substances, and appearing or disappearing at pleasure.*

The three angels that appeared to Abraham in Mamre did not approach gradually from a distance, as two of them did that same evening to Lot, but suddenly stood by him as he sat in the tent door, at mid-day.

The angel that appeared to Gideon was first seen sitting under an oak, which was in Ophrah (Judg. vi. 11); but after the interview, he suddenly went out of his sight (ver. 21).

The angel Gabriel appeared to Zacharias as he was offering incense in the temple; his coming and his departure must have been unseen.

The angel that rescued Peter from prison must have

passed through the walls or gates of the prison, in order to reach him (Acts xii. 7).

The spiritual body of Christ was possessed of the same power. A careful examination of the history will shew that the body of Christ came out from the sepulchre before the angel rolled away the stone. The angel descended from heaven and rolled away the stone to shew that He was risen, not to release him from captivity.

At Emmaus, after discovering Himself to them in the breaking of bread, it is said that he vanished out of their sight (Luke xxiv. 31). "The same day at evening also, being the first day of the week, when the doors were shut where the disciples were assembled for fear of the Jews, came Jesus, and stood in the midst, and saith unto them, Peace be unto you" (John xx. 19). "And after eight days, again his disciples were within, and Thomas with them. Then came Jesus, the doors being shut, and stood in the midst, and said, Peace be unto you" (ver. 26).

Taking into consideration the manner in which these incidents are related, and the circumstances connected with them, we cannot suppose that these actions of our Lord's spiritual body were, strictly speaking, miraculous,—they were natural, and characteristic of the body which he now possessed. True miracles are never wrought except for the purpose of proving something not previously revealed, and when the miracle has been wrought, the proof is so complete that no doubt can remain in any candid mind. If these extraordinary powers, now exhibited in Christ's spiritual body, were miraculous, they could prove nothing that was not known before. The only thing to be proved at this time was the reality, the power, and the glory of the resurrection body. But so

far from these wonders being calculated to prove the reality of His resurrection, they produced the very opposite impression, for the disciples imagined that they saw a spirit and not a material body. It was even necessary for him to draw their attention to the grosser qualities of matter, "Handle me and see," said He, "for a spirit hath not flesh and bones, as ye see me have." This shews where their doubts really lay, and if any miracle had been needed to convince them, it would not be such miracles as coming through walls, and appearing and disappearing from their sight. He would, no doubt, desire that His disciples should have sensible evidence of the superior power and glory of the resurrection body, which they themselves were to possess, and no idea would have been conveyed by Paul's language, when he said that our bodies are to be fashioned like unto His glorious body, if the only natural acts of that body were nothing different from those of the bodies which they already possessed—eating, speaking, walking, and being handled. If our bodies, which are sown in weakness, are to be raised in power, what illustration would Christ's resurrection body give of that power, if their actions were not according to its ordinary and natural capabilities?

What a glorious prospect does this present of the future state of the blessed! The whole universe of creation is thrown open to us, and we are made capable of knowing and enjoying it, in the service and communion of our Father its Creator.

CHAPTER XVIII.

NATURAL HISTORY OF THE DEVILS.

IN endeavouring to collect the feeble and scattered light that Scripture sheds upon the natural history of the devils, it will be desirable first to state, summarily, the facts which seem most firmly established.

1. It is very evident that the devils, or unclean spirits, are not, like the angels, possessed of any bodies of their own, and if, according to the unity of design observed in all God's creation, there is but one type according to which all the sons of God were originally created, we may also assume that the devils were once possessed of natural bodies like Adam.

2. As the wages of sin is death, we may suppose that when the angels fell from their original state of innocence they became mortal, and when they died their bodies were laid in the dust, and their spirits cast down into the deep, although they are permitted to visit the earth as the enemies of our souls.

3. In our English translation the word "devil" is the rendering of two different Greek words, *δαίμων* or *δαίμωνιον*, and *διάβολος*; and as there appears to be a very marked distinction observed in the use of these words, it may be profitable to examine the passages in which each of them occurs. We shall first take those passages in which the word *daimon* or *daimonion* occurs; and in order to shorten

the quotations, it is sufficient to notice that to this class belong all those passages where *demoniacal possession* is spoken of, *diabolos* never being used in this connexion. The other passages are as follow :—

- Matt. xi. 18. He hath a demon.
 Luke ix. 1. Gave authority over all demons.
 Luke x. 17. Even demons are subject to us.
 John vii. 20. Thou hast a demon.
 John x. 21. These are not the words of him that hath a demon.
 1 Cor. x. 20. The Gentiles sacrifice to demons; I would not ye had fellowship with demons.
 1 Cor. x. 21. The cup of demons; the table of demons.
 1 Tim. iv. 1. Doctrines of demons.
 James ii. 19. Demons believe and tremble.
 James iii. 15. This wisdom is earthly, sensual, demonish.
 Rev. ix. 20. That they should not worship demons.
 Rev. xvi. 14. The spirits of demons working miracles.
 Rev. xviii. 2. Habitation of demons.

We now cite those passages in which the word *diabolos* or devil occurs :—

- Matt. iv. 1. Jesus was led into the wilderness to be tempted of the devil.
 Matt. xiii. 39. The enemy that sowed the tares is the devil.
 Matt. xxv. 41. Everlasting fire, prepared for the devil and his angels.
 Luke viii. 12. Then cometh the devil, and taketh away the word out of their hearts.
 John vi. 70. One of you is a devil (εἷς διάβολός).
 John viii. 44. Ye are of your father the devil.
 John xiii. 2. The devil having put into the heart of Judas to betray him.
 Acts x. 38. Healing all that were oppressed of the devil.
 Acts xiii. 10. (Elymas the sorcerer) Thou child of the devil.
 Eph. iv. 27. Neither give place to the devil.
 Eph. vi. 11. The wiles of the devil.
 1 Tim. iii. 6. The condemnation of the devil.
 1 Tim. iii. 7. The snare of the devil (2 Tim. ii. 26).
 Heb. ii. 14. Him that had the power of death, that is, the devil.
 James iv. 7. Resist the devil.
 1 Peter v. 8. Your adversary the devil, as a roaring lion, walketh about, seeking whom he may devour.
 1 John iii. 8. He that committeth sin is of the devil. Destroy the works of the devil.

- 1 John iii. 10. Children of the devil.
 Jude 9. Michael contending with the devil.
 Rev. ii. 10. The devil cast some into prison.
 Rev. xii. 9. That old serpent, called the Devil.
 Rev. xii. 12. The devil is come down.
 Rev. xx. 10. The devil that deceived.

From a comparison of these two lists of passages, we at once perceive that the two words, demon and devil, are not used indiscriminately. So distinct, indeed, is the difference, that, without referring to the Greek or to this list, we could almost tell from the context which of the words was used in the original. The most remarkable circumstance, perhaps, is that the word devil is always used in the singular and never in the plural. We have no Scripture authority for saying that there are more devils than one, although there are many demons.

But we would not be justified in concluding from this that the devil and the demons are different from one another, in either their nature or their character; for although we have, in the temptation of our Lord, an undoubted historical instance of a single individual being called the devil, we have also undoubted evidence that *the works of the devil* (1 John iii. 8) was a generic expression which included the oppression of men by the influence of the demons, as in Acts x. 38, "God anointed Jesus of Nazareth with the Holy Ghost, and with power; who went about doing good, and healing all that were oppressed of the devil."

And this affords us also a satisfactory explanation of several other passages, which, were they to be understood without this explanation, would seem to imply that *the devil* was an omnipresent being, capable of working intelligently in thousands of different persons at the same time—making him, in this way, nearly of the same nature

with God. Thus, in the parable of the sower (Luke viii.), every inattentive hearer is represented as having the word taken away by the devil. It is enough to suppose that the demoniacal agency is here referred to, without the necessity of the prince of darkness being the immediate and personal agent. We might even go a step further, and suppose that the demons, as a class, are called the devil, without *necessarily* referring to any individual.*

Before the flood we have no evidence of the existence of demons, though we have proof of the existence of Satan, whose angels they are, but whom they do not altogether resemble. He is one, they are many: he is crafty, they are brutish: they trembled at Christ's presence and deprecated his displeasure, he held proud converse with God regarding Job, and dared both to tempt and assault our Saviour. What may be the real nature of these differences we are not at present in circumstances to determine; they require additional facts to explain them, but they do not contradict what has been suggested. That Satan is a spirit there seems little reason to doubt. All that we read about him is consistent with this supposition. If so, we infer that he once had a body, in which he died; nevertheless, it is quite possible that thousands of angels sinned before the creation of Adam, and although God gave no delegated authority to one over the others, it is no more than we might expect from the operation of natural laws, that one of these spirits should, to the misery of himself and them, gradually predominate over his fellows, and at length exercise the authority of a despotic power as their prince and captain.

The subject, however, is involved in much obscurity.

* See Appendix F, G.

CHAPTER XIX.

THE UNFALLEN SONS OF GOD IN OTHER WORLDS.

WE have endeavoured to shew that, although science does not encourage the supposition that every world is inhabited, neither does it give us any reason to doubt that there are millions of them the abodes of moral and intelligent beings.

Scripture also unites its testimony on the subject, in those passages where, under the names of the "sons of God," and "the hosts of heaven," we are to understand not only the stars but their inhabitants :—

Thou, even thou, art Lord alone : thou hast made heaven, the heaven of heavens, with all their host, the earth, and all things that are therein ; thou preservest them all, *and the host of heaven worshippeth thee* (Neh. ix. 6).

Where wast thou when I laid the foundations of the earth, *when the morning-stars sang together, and all the sons of God shouted for joy !* (Job xxxviii. 4, 7).

As might be expected, these heavenly ones are subject also to the government of the Son of God. Peter says, "Jesus Christ is gone into heaven ; angels, and authorities, and powers, being made subject to Him" (1 Pet. iii. 22) ; and Paul testifies, "The Father of glory raised Christ from the dead, and set Him at His own right hand, in the heavenly places, far above all principality, and power, and might, and dominion, and every name that is named, not only in this world, but also in that which is to come ;

and hath put all things under His feet, and gave Him to be the head over all things to the Church, which is His body, the fulness of Him that filleth all in all" (Eph. i. 20-23).

It further appears that there is not an inhabitant of the most distant nebula, that is not in some mysterious manner interested in the mediation of Christ. Not only are they His subjects by virtue of His native glory, for "when He bringeth in the first-begotten into the world, He saith, And let all the angels of God worship Him" (Heb. i. 6); but in respect of His death and sufferings, He sways a sceptre more glorious still: "For it pleased the Father to reconcile all things to Himself by Him, whether they be things upon the earth, or things in the heavens—*ἐν τοῖς οὐρανοῖς*" (Col. i. 20); "That, in the dispensation of the fulness of times, he might gather together in one all things in Christ, both which are in heaven (*ἐν τοῖς οὐρανοῖς*), and which are on earth, even in Him" (Eph. i. 10); and so Christ announced, before leaving the planet on which He suffered, "All power is given unto Me in heaven and in earth" (Matt. xxviii. 18).

We have here, then, a proof that every intelligent inhabitant of the most distant star is under the government of the Lord Jesus Christ, so that, unless he be reprobate, he is the willing subject and the adoring worshipper of King Jesus; nay more—whether he knows it or not, the chief ground of this supremacy of the Lord Jesus Christ, is His humiliation unto death, while dwelling on this little world: "Let this mind be in you, which was also in Christ Jesus: who, being in the form of God, thought it not robbery to be equal with God; but made Himself of no reputation, and took upon Him the form of a servant, and was made in the likeness of men: and being

found in fashion as a man, He humbled Himself, and became obedient unto death, even the death of the cross. *Wherefore God also hath highly exalted Him*, and given Him a name which is above every name; that at the name of Jesus every knee should bow, of things in heaven, and things in earth, and things under the earth; and that every tongue should confess that Jesus Christ is Lord, to the glory of God the Father" (Phil. ii. 5-11).

As human nature is the highest type of creation, we infer that Adam and Eve, when they came at first from the hand of their Creator, were true specimens of the inhabitants of the other stars. We should expect, perhaps, that there may be some constitutional variety in the different races, adapting them to the peculiarities of their habitation; but, upon the whole, the human form and the human constitution in all probability prevails so decidedly, that we could not hesitate to call them brethren.

The concurrent testimony of Scripture and science establishes the fact, that the difference between the fallen and the unfallen physical state of man is not so great as is generally supposed. This difference consists in these three distinctive features:—

1. The unfallen man never dies.
2. The unfallen man never sins.
3. The unfallen man never loses his intercourse with God.

It is the *combination* of these three that renders each of them natural and easy. If men never sinned—if both body and mind were so conserved by temperance, prudence, wisdom, and caution within, and by conscientiousness and benevolence without, we could scarcely understand how life could be menaced by external violence,

more especially if our intercourse with God added a crowning security against danger or accident ; all that would be necessary for the complete realisation of immortality would be the absence of decay and infirmity of age.

And yet, ask any physiologist or anatomist, and he will tell you that he can discover no reason why man should not be immortal, except this, that we do not find that he is so ; and if it should so happen that man became immortal, we could not discover any sensible difference in the economy of our bodies from what we observe to exist at present.

Let us suppose that a clock were invented that not only told the hours, but also regularly wound itself up. Let us suppose that it had a little bottle of oil with which it lubricated its pinions, and produced a constant supply of that oil from some chemical change which it produced upon the air. Such a clock would be an everlasting clock, were it not that its wheels would wear out by friction, constant however small. But if, in addition to all else, it were capable of renovating all its parts, so that, as each wheel began to wear, it would be replaced by another perfectly new, we should have an exact representation of the powers of our body. We are able to wind up our energies by daily supplies of food and nightly rest,—we are also able to lubricate the entire system by the hallowed resting of the Sabbath-day,—and to complete the perfection of our physical constitution, the circulating blood is continually depositing new matter in our bones and flesh, and removing the exhausted matter when it is no longer capable of carrying on the animal economy. What more do we need for immortality ? Not only is this economy of our system sufficient to *maintain* our bodies, in the earlier periods of our life it is able even to

increase their quantities and *repair* their injuries. The wonder is, not that we should ever have been immortal—the wonder is that we should be mortal now; for it may be safely affirmed that there is not a single action of the system which would be necessary to secure immortality, but what has been found by naturalists to be not only possible, but already in existence in some portion or another of nature's economy.

The second great peculiarity of unfallen man is, that he never sins; and here, again, the wonder is not that man should ever have been sinless, but rather that he should be sinful now. There is no propensity of our nature that is sinful in itself, or that would not better fulfil its end by acting in a sinless manner. This latter fact is sufficient to prove that the original and normal state of man was holy. Throughout all nature we find everything beautiful and well adapted to its circumstances, and every instinct perfect both in its end and its action. There are no blunders in nature; but sin is a blunder—it is the diseased action of powers and propensities which would effect their purpose better without sin. For this reason, it is evident that if God made man as he is, he made him wrong. There is no beauty in sin: the passionate discontented child—the lying boy—the unchaste woman—the drunken man. It is true that the morbid character of sin is most evident in its exaggerations; but if it be possible for all the propensities to act without sin, then all sin is on that account a disease.

When Adam sinned and became mortal, the change consisted simply in the *derangement* of his constitution. He had still an eye for beauty, and an ear for harmony; he had still the power of comparison and the faculty of

analysis ; and if, in his fallen state, there still remained the instincts of benevolence, veneration, and conscientiousness, why should we suppose that any of the other faculties which we now possess were originally wanting? Even those four grand propensities which minister most directly to the works of the flesh and the devil,—conjugal love, combativeness, desire for property, and love of power,—were those that were especially requisite for the fulfilment of God's benediction when he said, "Be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth." The existence of these and other instincts was essential even for the enjoyment of the blessing, and so long as they were rightly balanced and controlled by the regulating faculties, their action and gratification could never be productive either of sin or misery.

It must not be supposed, however, that the highest amount of happiness would be obtained by the entire absence of suffering. This, though a very common notion, receives no countenance either from science or revelation. It is generally supposed that if Adam had never sinned, he never would have hungered—never thirsted—never wearied; and that fear, and pain, and regret would have been sensations entirely unknown. It is supposed that he would have eaten his bread without labour, and possessed knowledge without study.

If this had been the testimony of Scripture, we should certainly find great difficulty in reconciling it with the teachings of science; but not only is it unsupported by Scripture, and contrary to the very principle of man's constitution, it is also inconsistent with human dignity, human usefulness, and human enjoyment. A life of such

luscious pleasure, whatever it might seem by contrast and in the distance, would, in the actual enjoyment, be at first degrading, after that paralysing, and at length insufferable.

We might take even higher ground than this, and say, that a small measure of discomfort was necessary for the enjoyment of the highest gratifications of life. How could food be enjoyed unless there were both hunger and thirst? how could the balmy repose of sleep be welcomed without some measure of fatigue? and how could the holy rest of the Sabbath-day be enjoyed, or even needed, unless both body and spirit felt that their springs of action required for a time to be unbent?

Even pain to some extent would be necessary, else there could be none of those nerves of sensation necessary, by which we are warned of the approach of danger. Pain is a most valuable system of protection against mutilation and destruction. If burning, and cutting, and bruising, gave us no pain, our bodies would not survive a year, unless our attention were kept in a constant state of distressing and exhausting watchfulness, a thousand times more disagreeable than the pain it was intended to supersede.

There could be no dignity or even enjoyment in enterprise where there was no difficulty to be overcome, or experiments to be made; and there could be no interest in, or any need for experiments unless they were occasionally attended with failure and disappointment. The very existence of some faculties enables us to infer some corresponding circumstances: for there would be no need of caution where there was no kind of danger; no benevolence where there was no kind of want; and no conscientiousness where there was no kind of temptation.

Does any one feel as if, in drawing these conclusions,

we were robbing Paradise of its flowers? on the contrary, it is these very things that give them their most delicate fragrance and their brightest hues.

Supposing Adam and his descendants to be an ordinary specimen of the inhabitants of other worlds (and we have already shewn how very likely this is to be the case), we may obtain much insight into their probable constitution in those worlds where sin has never entered.

Although the first pair in each case must come from the hands of their Creator in a state of maturity, the institution of marriage before the fall, and the blessing pronounced upon it, lead us to infer that other worlds are peopled by the propagation of the species. "Be fruitful, and multiply, and replenish the earth, and subdue it," is in all probability the blessing pronounced upon the patriarchs of many, if not all, of the stars.

It has been argued by men whose orthodoxy has never been called in question, that the institution of marriage implies also the necessary accompaniment of death; because the indefinite propagation of species in a world, however large, would at some time or other produce overpopulation. This is a conclusion, however, which is scarcely warranted by any slender materials within our reach. We cannot tell the numberless resources by which the Creator might have obviated what we suppose a difficulty. Perhaps it was by means of which we have no understanding at present; for, alas! we have had too little experience of the sinless state of our race, and the developments which would have arisen from it; but we may suggest one which would of itself be sufficient to remove the apparent difficulty.

From a consideration of the topics contained in the pre-

ceding chapters, it seems more than probable that, after a certain period, a change of constitution takes place, by which, either suddenly and in the twinkling of an eye, or, as is more probable, in a gradual manner, the body undergoes a transformation, so that that which is at first a natural body (*σῶμα ψυχικόν*) becomes a spiritual body (*σῶμα πνευματικόν*), more glorious and more powerful than before. This seems to have been the original and normal constitution of our nature, just as the butterfly is the normal transformation of the caterpillar;* and it is still in all probability the constitution of every unfallen race in the sidereal heavens. If Adam had not sinned, we have reason to suppose that his spiritual nature would have been developed in due time—not by any miraculous interposition of Divine power, but by the operation of natural laws, and that his state of probation would then be completed. In consequence of Adam's sin, however, his constitution became hereditarily deranged,† so that this capability was destroyed, and man's progress arrested—that is to say, his nature became incapable of rising above the merely animal type.

We find in Scripture that the spiritual body is not peculiar to man in his resurrection state: it appears to be a product of other worlds as well as our own; the only difference is, that, in regard to the angels, it is developed

* "There was no secular subject on which the brave and suffering invalid dwelt with more pleasure, than the evidences of God's wise and merciful design, which the construction of all the creatures of His hands displays. He would forget the pain which speaking occasioned in enlarging upon it to the ladies of his family; and loved to point out the beautiful type and symbol of man's resurrection, which the transformation of insects supplies, dwelling especially on the curious changes which the ant-lion undergoes."—*Dr G. Wilson's Life of Dr John Reid*, p. 220.

† See Appendix K.

in a normal and spontaneous manner, whereas, in our case, it required an exterior influence and a Divine interposition to accomplish the same or a similar result. This is a subject, however, which will present itself for more particular examination in a future chapter: we refer to it here only because of the light which it will shed on our present subject. If the resurrection, or rather the angelic state, be the ultimate development of every unfallen race, and if the ability to pass from one star to another be one of its peculiarities, then may we not suppose that many of the stars are, as it were, the cradle of angelic hosts, from which, it may be, thousands of other stars are peopled; and that these other stars, though they may be incapable of sustaining psychical bodies such as ours, may be even better adapted for the full enjoyment and activity of more spiritual natures?

CHAPTER XX.

DEATH AND CARNIVOROUS ANIMALS IN THE STARS.

It is very generally supposed that, in our own world before the fall, there was no death among the lower animals, and, consequently, that in the worlds where sin has never entered, all is harmony and peace—every creature being immortal, and no class of animals preying upon its fellows.

Whatever may be the case with other worlds, this notion receives no proof or confirmation from what we know of our own. Before Adam existed there was death, not only among the animals that existed in his day, but among the far back tribes that lived and died thousands of years before him. Among the fossil animals which meet the gaze of the wondering geologist, there are many structures which bear evidence of a constitution according to which the animal subsisted by preying upon the bodies of others: for in the stomachs of some of these carnivorous creatures, there have been found the bones of the animals which had last become their prey.

Those who deny the pre-Adamite succession of tribes and species, and who adhere to the literal meaning of the statement, that in six days God made heaven and earth, the sea, and all that in them is, have no choice but to hold to the doctrine of death before the Fall, because it is as necessary to their view as to any other; for if the

present races of animals were created as we find them, then they were incapable of existence without feeding one upon another.

Perhaps it will be said, that, at first, the original food of all animals was vegetable, and that it was only at the Fall that their nature became changed. As God made them, they were peaceful and happy, unwilling, and perhaps also unable, to inflict injury upon one another. The lion lay down with the lamb, and the tiger fed upon grass like a sheep. It was only when man sinned that a blighting curse fell upon nature, and strife, and cruelty, and death were let loose upon the world, involving not only Adam and Eve, but also the animals which had been created along with them.

To those who know anything of physiology, this carries its own contradiction. To say that the tiger fed on grass like an ox, is to say that there were no tigers at all at the time. The teeth and stomach of the ox are such as to enable it to feed on grass; but the teeth and stomach of the tiger are such as to render it impossible to live upon vegetable food. Its limbs are made for leaping on its prey, its claws for seizing, its teeth for tearing, and its simple stomach for digesting only animal food. It could not crop grass if it would; and even supposing that it would and could, the grass, when eaten, could not be turned into blood, because the apparatus possessed by the ox for this purpose is wanting in the tiger. In order to live on grass, the lion and the tiger must have been created without claws or tusks; with limbs adapted for grazing, and not for leaping on their prey; with teeth for cutting and chewing grass, and a capacious stomach like that of the ox for converting it into nourishment. The muscles, and the peculiar formation of the jaw itself, fitting it for

breaking and crushing bones, would be without any use; and, in short, the necessary alterations would be so great that it would be no longer a tiger, but some other totally different but most uncomfortable animal.

The spider, in like manner, must have been intended to live upon flies. Its instincts and its structure prove this. Take away its animal food, and its ability to kill, and its web will be of no use, and it would die for want of nourishment.

The testimony of physiology is, therefore, very decided; Scripture may be less so, but it is not contradictory. It is true that, in the original grant of vegetable food to man and the lower animals, there is no mention of animal food. "I have given you," says God, "every herb and every tree; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat" (Gen. i. 29, 30). But a little study will shew that the difficulty is more apparent than real. Strictly speaking, and in its most philosophical sense, the vegetable kingdom *is* the food of every animal, whether that nourishment be received directly, or only through the system of another. The sheep, and the horse, and the deer feed directly upon the vegetable kingdom, because they all have the power of converting vegetables into blood; but the vegetables, being converted unto blood by their means, become again the food of the lion and the tiger, when to them they fall a prey. Nor is this a mere quibble upon words. It is an argument which we *must* use to escape a difficulty, arising from the inability of the young animals to subsist except by being for a little time suckled by their dams. The calf and the lamb, for example, do not feed directly upon

grass, and yet no one would dream of bringing this as a contradiction to the Word of God. They *indirectly* feed on grass, because, by the mother feeding upon grass and converting the nourishment of the grass into milk, the Scripture is really fulfilled; so, when the grass is converted into flesh and blood by means of the ox and the sheep, the lion and the tiger on the same principle are dependent upon the vegetable kingdom for their supply of nourishment.

It is exceedingly probable that, previously to the Flood, mankind lived upon vegetables alone: partly, perhaps, because at that time animal food was not required, but chiefly because it was not till after the Flood, that man received the grant of animal food for his subsistence. But even when that grant was made, we do not find any of the lower animals included in it. If, therefore, their being carnivorous depended on a formal grant of animal food from God, we are no more warranted in denying that it existed before the Fall, than we would be in asserting that it does not exist now.

"But," it will be said in reply, "if death and suffering existed before the Fall, then where is the justice of God in permitting death where there was no sin?" "Nay but, O man, who art thou that repliest against God?" What right has or had any animal to be immortal? If God gave any animal its life at first, what obligation rested on Him to continue it for ever? Should we not rather say in humble adoration, "The Lord giveth, and the Lord taketh away; blessed be the name of the Lord?" It was only in consequence of the promise involved in the Edenic covenant, that God became pledged to Adam to give him life as a reward of perfect obedience; without such a covenant there was no claim, and certainly the covenant with

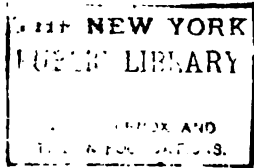
Adam did not comprehend the lower animals within its stipulations.

The connexion between death and sin spoken of by Paul in his Epistle to the Romans, refers only to man:—

Wherefore, as by one man sin entered into the world, and death by sin; and so death passed upon all men, for that all have sinned (Rom. v. 12).

For if by one man's offence death reigned by one; much more they which receive abundance of grace and of the gift of righteousness shall reign in life by one, Jesus Christ (ver. 17).

Had sin not entered into the world, man would have been immortal; this seems to be required by Paul's argument; but to suppose that the lower animals also would have been immortal, is required neither by the argument, nor the analogy of this passage. It is a supposition that will not bear five minutes' thought, because, independently of the anatomical argument drawn from the structure and constitution of the carnivorous animals, death among the lower animals would be necessary for the habitability of the world. Think of the plagues ever increasing with which the earth would be visited; the vermin indestructible, the flies immortal, and the fishes, whose progeny count by thousands and millions, swarming in the sea until there should not be room to hold them. The plagues of Egypt would be nothing to it.





THE CEREBRO-SPINAL NERVES.
THE RESIDENCE OF THE SPIRIT OR PNEUMA.

CHAPTER XXI.

THE NERVOUS SYSTEM.

THE light which Scripture sheds on the natural history of the human race may be still further increased by an examination of the structure of the human body. It is a well-established doctrine of Scripture, that the body is animated by an intelligent and immortal spirit, that feels and acts by means of its material mechanism, without being itself material. We also learn from Scripture, that at death the spirit is not destroyed with the body, but only separated from it, and is capable of maintaining an independent existence; so that in its disembodied state it possesses a measure of consciousness and intelligence sufficient to preserve its identity of person.

It may be desirable, but certainly it is not necessary, that we should be able to prove a doctrine by means of two distinct processes; and therefore, although our researches in anatomy might never conduct us to the necessary conclusion, that there is an immortal spirit resident in every human body, it is sufficient that such a conclusion is warranted by Scripture, and is, at the same time, quite consistent with all the teachings of natural science. It may be that this admission would also involve the probability that every animate object, however low in the scale of creation, has some immaterial substance connected with it, corresponding to the human spirit; but it does

not follow that these substances are immortal: on the contrary, Scripture speaks of the lower animals as "the beasts that perish," and affirms, that while the spirit of a man goeth upwards and returns to God who gave it, the spirit of a beast goeth downwards. It may be that anatomy might never be able to prove such a distinction between the two natures—it is enough that it does not disprove it, and, therefore, Scripture testimony is sufficient for our purpose.

Taking for granted, then, that there is an immortal spirit distinct and separable from the body, we next inquire what light anatomy throws on their connexion and action one upon the other.

On examining the human body, we find a canal running through the back-bone, filled with nervous matter, which reaches to the brain at the top, and sends out, at different places, through its entire length, cords and filaments, which branch out, like the ramifications of a tree, over the whole body: this is called the cerebro-spinal system. It has also been found that this nervous matter consists of two distinct columns, different from one another, and performing totally different functions. One of these columns (the posterior) consists entirely of sensory nerves, by means of which the spirit receives impressions of things without; the other consists of motor nerves, by which the spirit is able to set the body in motion, by energising the muscles. It is by means of the former of these, spread over the whole body, that the spirit within receives intelligence of what is taking place without; because by means of them the sensations of heat and cold, resistance and pain, are experienced. It is the same kind of nerves that communicate with the eye and the ear, although they do not pass through the back-

bone. The optic nerve passes directly from the brain into the back of the eye-ball, and spreads itself over the whole of what is called the retina, to receive the light that passes through the pupil.

The second or anterior column of nerves which are contained in the hollow tube of the back-bone, is of a totally different nature: these do not convey intelligence *to* the spirit, but they convey energy *from* the spirit to the muscles in order to produce action; they are called the motor or moving nerves, and it is by their means that the spirit is able to set the body in action.

We may regard these two columns as like the double line of rails on a railway; one line of rails carrying the trains in one direction, the other carrying them back in the opposite direction: the column of the sensitive nerves carrying despatches upwards and inwards,—the column of the motor nerves carrying the despatches downwards and outwards.

Supposing, then, that we cut across the first of these columns, the immediate consequence is, that sensation in all the parts beneath the section stops. They may be cut, bruised, or burned without producing pain or any sensation whatever; and yet, while the motor column continues whole and healthy, the power of the body remains as before. It is like the cutting of the telegraphic wires by which communication is interrupted.

If, instead of cutting the first, we cut across the second column of nervous matter, a very different result is experienced. Sensation continues in its usual manner, but voluntary motion is now impossible; the limbs are paralysed and hang loose upon the body, because the spirit has ceased to have any control over, or communication with the muscles.

Here, then, we have a view of the residence of the human spirit, with all its furniture and conveniences provided. By means of the brain and the spinal cord, the spirit becomes embodied and present to our observation, and is able to hold converse with external nature. Without such an apparatus its communications would be stopped, and, being practically absent, would be an agent mysterious and unknown.

CHAPTER XXII.

PHYSIOLOGY OF THE SPIRIT.

ALL God's works are according to law—it is His method; and the more we think of it, the more do we see its necessity as a covenant between God and creation. Without law there could be no independent action among the creatures, far less could there be responsibility. It is God who makes the gunpowder explode in the assassin's pistol, and the poison operate in the body of his victim. If He did not do so—if He introduced His own moral perceptions and sovereign will so as to modify or suspend the laws of His administration, the act would be the act no longer of the creature but of the Creator.

Even miracles are according to law, and until we adopt this view of them we never can finally set aside Hume's argument against them. Belief in law is an instinct of our nature, but it is stronger in some men than in others. In some it is so weak as to seek an explanation of all extraordinary phenomena in the sovereign will of the Deity; in others it is so strong as to assert the infinite, eternal, and unchangeable justice of God's physical laws. They are quite prepared to admit the goodness, mercy, and justice of God, but they feel that these must act, not in violation of, but in accordance with law. Such a mind was Hume's. There can be little doubt that in his

celebrated argument he drew his inspiration from a deep-seated and instinctive conviction of the inviolability of the physical laws; and that, when he elaborated it into a logical shape, this was the last, and to his own mind, perhaps the least satisfactory form into which he could put it. If Hume had received the definition of a miracle as "the act of a superhuman agent acting according to law," his logic and his instinct would alike have been satisfied. His only difficulty would have been the question of the existence or non-existence of any superhuman agent; but in the settlement of this question logic and instinct would have had no jurisdiction.

It is the duty of science to recover from the domains of mystery to the domain of law all the phenomena of nature, and although its past achievements have been almost entirely confined to things outward and visible, we are warranted in believing that the phenomena of life and intelligence are not less within the pale of its dominion.

To say that spiritual phenomena emerge according to law, is to assert that there is a physiology of the spirit; and although it has not as yet been formally admitted into the list of sciences, it is by no means unlikely that we have already broken ground upon the subject in the recent discoveries of the convertibility and indestructibility of "force"—doctrines most valuable, not so much on account of their own importance, as because of their being the avenue to an entirely new field of research.

What is meant by the *convertibility* of force is this—light, heat, electricity, magnetism, and momentum (possibly also chemical affinity, gravitation, and elasticity)—are all of them different modes or forms of one essential "force." This force can assume any of these forms, and change from one to another without losing its identity.

For example, if we have it in the form of heat, we may change it into light by concentration, or into momentum by the steam-engine. If we have it in the form of electricity, we may change it into light by the electric spark, or into heat by the attenuated wire, or into magnetism by the artificial magnet, or into momentum by the electromagnetic engine. If we have it in the form of momentum, we may change it into light by percussion, or into electricity by the electric machine, or into heat by friction.

What is meant by the *indestructibility* of force is, that, as it cannot be generated from any source, so neither can it be spent, lost, or destroyed. For example, if it exist in the form of momentum, it can never stop unless it be changed into some of its other forms, such as heat or electricity. If one elastic ball be struck by another of equal weight it will fly off in the same direction, and with the same velocity, after having received its momentum. The other ball which communicated the impulse will be at the same instant put to rest. But, suppose that a leaden ball is shot against a rock, and is thus arrested in its course without communicating motion to the rock which it strikes, the force is not destroyed,—it is converted into heat, and the amount of heat produced will be an exact equivalent of the force expended in producing it.

There is yet one other quality of force which we must notice, and that is, its capability of being stored up in a latent or quiescent state. For example, steam and water contain latent force, and this latent force may be developed as an active force by the steam becoming water, and the water becoming ice. Electricity also may store up force in a latent state by decomposing water. It then resides in the oxygen and hydrogen of which the water was composed, under the form of chemical affinity, and is developed

in the form of light and heat when they are again united in combustion.

But this is not all: the forces which exhibit themselves in the phenomena of inorganic matter are found to be related to the forces which are in action in living organisms. There is, therefore, another convertibility of which force is capable, by which light, heat, and electricity can be converted into another, or living force, possessing perfectly different properties, and in the production of which the original force disappears. This is proved by the fact that the new force may be reconverted into the old; that is to say, light, heat, and electricity may be converted into living force, and living force may be reconverted into light, heat, and electricity.

The ascent which thus takes place in the translation of inorganic into organic force does not end in its vegetable form. The force peculiar to vegetable life undergoes a still further translation into the force peculiar to animal life, and yet the same law operates; there is no generation of force, and there is no destruction of it. All the forces in operation in an animal body were originally light, heat, and electricity, but it was necessary that they should undergo an intermediate change by means of the vegetable kingdom, in order to render them accessible to animal life, because animal life is unable to draw its supplies of vital energy directly from the inorganic kingdom. Vegetables can live on light and heat—animals require the intermediate action of vegetable life to make these forces available for their support.

So far as we have gone, we are guided by observation and experiment; another step in the same direction leads us directly to the physiology of spirit; and if the original force of light and heat ascend by translation, first into

the vegetable kingdom, and after that, by a second translation, into the animal kingdom, we have strong reason to conclude that the forces of spirit life are only a third translation of the original force, and not the generation or creation of a new one.

It has long been an interesting question among scientific men, whether light be a material substance, or no substance at all, all its phenomena being capable of explanation on the hypothesis that it is nothing more than the effect of vibrations, or modulations, communicated to a medium supposed to exist throughout the universe. May it not be that neither of these views is the true one, but that God has created another kind of substance, altogether different from matter, of which light, heat, and electricity are some of the forms—a substance which is as varied and invariable in its properties, and as indestructible in its essence, as matter itself?

It is difficult, indeed, for us to conceive of force being an actual substance distinct from matter; and were it not for its indestructibility, and still more for its being found to exist in a latent or quiescent state, it would not be necessary that we should; but our studies in nature are continually bringing us into contact with new conceptions, the unexpected nature of which fills us at first with curious surprise, but this, after a more mature experience, ripens into reverential admiration. The nature of spirit-phenomena, also, would lead us to anticipate some such discovery as this; and whether it be or not the substance of which spirit is composed (supposing it to have a substantive existence), it cannot differ very widely in its attributes from those which we have described as belonging to "force." In its ascent from its inorganic forms into organic life, where it assumes a *quasi*

organic character (beginning with its performances in the vegetative cell of the red snow plant, and rising upwards into the vital forces of the animal economy), we discover a line, which, though we fail to trace it, seems to point significantly to the nature and powers of the human spirit. It resembles spirit, in being correlative to matter without being matter itself, and in being void of those two great characteristic properties of matter, gravitation and impenetrability; and if force be not only incapable of being destroyed, but also incapable of being generated, may we not conclude that the physical energy possessed by the human spirit, and exercised upon the nervous system, has been elaborated, first by vegetation, then by animal life, and at last received its full development as spirit-energy?

There still remains the question, what relation does spirit-energy bear to spirit-substance? a question to which we possess no materials to provide a direct answer. We have indeed analogies of vegetation and animal life, but these cast rather an inquiring than an explanatory light upon the subject. That there is something in the plant more than its mere matter, that first converts and then wields the force which it appropriates, there can be no doubt; but what that something may be is the mystery—a mystery perhaps reserved for the studies of a future existence, when we shall know even as we are known.

The subject will again occupy our attention, when we come to speak of the soul or *Psyche* (which is distinct from the *Pneuma*). In the meantime we shall endeavour to collect and arrange what information we possess, regarding the functions and phenomena of spirit, as recorded in the historical narratives of Scripture.

CHAPTER XXIII.

DEMONIACAL POSSESSION.

THE spirit that is generated with or from the body will fit it best, just as a man's own coat will sit better upon him than the coat of another; and yet we find that other spirits are capable of affecting, or even taking possession of, bodies which are not their own. This susceptibility gives rise to different kinds of phenomena, which have been observed in all ages and in all countries, but which have been so mixed up with fable and imposture, that it would be difficult to obtain any certain information regarding them, were it not that in Scripture we have sufficient materials for the purpose; and these being authenticated by inspiration, may be used to throw light upon the corresponding passages of ancient and even modern history.

The most aggravated form of spiritual influence is that of demoniacal possession, in which the alien spirit usurps the place of a man's own spirit, receiving impressions from his nerves of sensation, and throwing the body into action by means of the motor nerves and muscles, using this usurpation for malignant purposes. This kind of possession appears to have been an epidemic of no ordinary severity during the ministry of our Lord and His apostles, visiting alike men, women, and children.

The value of these records, in a scientific point of view, cannot be overvalued, and for this reason we shall tran-

scribe from different passages of the New Testament history, what may be regarded as leading features of the subject:—

No. 1.

And John answered and said, Master, we saw one casting out devils in thy name; and we forbade him, because he followeth not with us. And Jesus said unto him, Forbid him not: for he that is not against us is for us.—(Luke ix. 49, 50.)

No. 2.—(*Harmonised.*)

A certain woman, whose young daughter had an unclean spirit, heard of Jesus, and came and fell at his feet; and she cried unto him, saying, Have mercy on me, O Lord, thou Son of David; my daughter is grievously vexed with a devil. But Jesus said unto her, Let the children first be filled: for it is not meet to take the children's bread, and to cast it unto the dogs. And she answered and said unto him, Yea, Lord; yet the dogs under the table eat of the children's crumbs. And he said unto her, For this saying go thy way; the devil is gone out of thy daughter. And when she was come to her house, she found the devil gone out, and her daughter laid upon the bed.—(Mark vii.; Matt. xv.)

No. 3.

Then was brought unto him [Jesus] one possessed with a devil, blind and dumb: and he healed him, insomuch that the blind and dumb both spake and saw. And all the people were amazed, and said, Is not this the Son of David? But when the Pharisees heard it, they said, This fellow doth not cast out devils, but by Beelzebub, the prince of the devils. And Jesus knew their thoughts, and said unto them, Every kingdom divided against itself is brought to desolation; and every city or house divided against itself shall not stand: And if Satan cast out Satan, he is divided against himself; how shall then his kingdom stand? And if I by Beelzebub cast out devils, by whom do your children cast them out? therefore they shall be your judges. But if I cast out devils by the Spirit of God, then the kingdom of God is come unto you.—(Matt. xii. 22–23.)

No. 4.

And in the synagogue there was a man which had a spirit of an unclean devil, and cried out with a loud voice, saying, Let us alone; what have we to do with thee, thou Jesus of Nazareth? art thou come to destroy us? I know thee who thou art; the Holy One of God. And Jesus rebuked him, saying, Hold thy peace, and come out of him. And

when the devil had thrown him in the midst [and torn him], he [cried with a loud voice, and] came out of him, and hurt him not.—(Luke iv. 33-35; Mark i. 23-26.)

No. 5.

And one of the multitude answered and said, Master, I have brought unto thee my son, which hath a dumb spirit [he is a lunatic, and sore vexed]; and whosoever he taketh him [he suddenly crieth out,] and he teareth him; and he foameth, and gnasheth with his teeth, and pineth away [and bruising him, it hardly departeth from him]: and I spake to thy disciples that they should cast him out, and they could not. He answereth, and saith, O faithless generation, how long shall I be with you? how long shall I suffer you? Bring him unto me. And they brought him unto him: and when he saw him, straightway the spirit tare him; and he fell on the ground, and wallowed, foaming. And he asked his father, How long is it ago since this came unto him? and he said, Of a child. And oft-times it hath cast him into the fire, and into the waters, to destroy him: but if thou canst do anything, have compassion on us, and help us. Jesus said unto him, If thou canst believe, all things are possible to him that believeth. And straightway the father of the child cried out, and said with tears, Lord, I believe; help thou mine unbelief. When Jesus saw that the people came running together, he rebuked the foul spirit, saying unto him, Thou dumb and deaf spirit, I charge thee, come out of him, and enter no more into him. And the spirit cried, and rent him sore, and came out of him: and he was as one dead, insomuch that many said, He is dead. But Jesus took him by the hand, and lifted him up; and he arose. And when he was come into the house, his disciples asked him privately, Why could not we cast him out? And he said unto them, [Because of your unbelief; howbeit] This kind can come forth by nothing, but by prayer and fasting.—(Mark ix. 17-29; Matt. xvii.; Luke ix.)

No. 6.

And when he was come out of the ship, immediately there met him out of the tombs a man with an unclean spirit [which had devils a long time], who [wore no clothes, neither abode in any house, but] had his dwelling among the tombs; and no man could bind him, no, not with chains: because that he had been often bound with fetters and chains, and the chains had been plucked asunder by him, and the fetters broken in pieces: neither could any man tame him. And always, night and day, he was in the mountains, and in the tombs, crying, and cutting himself with stones. But when he saw Jesus afar off, he ran and worhipped him, and cried with a loud voice, and said, What have

I to do with thee, Jesus, thou Son of the most high God? I adjure thee by God, that thou torment me not [art thou come hither to torment us before the time?]. For he said unto him, Come out of the man, thou unclean spirit. [For oftentimes it had caught him: and he was kept bound with chains, and in fetters; and he brake the bands, and was driven of the devil into the wilderness.] And he asked him, What is thy name? And he answered, saying, My name is Legion: for we are many [because many devils were entered into him]. And he [they] besought him much that he would not send them away out of the country [and command them to go out into the deep]. Now there was there, nigh unto the mountains, a great herd of swine feeding [on the mountain]. And all the devils besought him, saying [If thou cast us out], [suffer us to go away], Send us into the swine. And forthwith Jesus gave them leave. And the unclean spirits went out, and entered into the swine; and the herd ran violently down a steep place into the sea (they were about two thousand), and were choked in the sea. And they that fed the swine fled, and told it in the city, and in the country. And they went out to see what it was that was done. And they come to Jesus, and see him that was possessed with the devil, and had the legion, sitting, and clothed, and in his right mind; and they were afraid.—(Mark v. 2-15, Matt. viii. 28, Luke viii. 26.)

No. 7.

When the unclean spirit is gone out of a man, he walketh through dry places, seeking rest, and findeth none. Then he saith, I will return into my house from whence I came out; and when he is come, he findeth it empty, swept, and garnished. Then goeth he, and taketh with himself seven other spirits more wicked than himself, and they enter in and dwell there: and the last state of that man is worse than the first. Even so shall it be also unto this wicked generation.—(Matt. xii. 43-45; Luke xi. 24-26.)

The first thing we have to notice in regard to demoniacal possession, is the name uniformly given to the unclean spirits. The word devil, which occurs so frequently in our English Testament, is the translation given to two different Greek words, which have not the same meaning, and which are never used indiscriminately, the one for the other. The first is *daimon* or *daimonion*, or, as we call it in English, *demon*. The other is *diabolos*, which is truly translated "devil." This fact has already been

noticed in a preceding chapter; it is only necessary further to say, that in all the cases of demoniacal possession the unclean spirit is called a demon, never a devil. The chief value of this distinction consists in the word demon being found in profane history, as the name given to spiritual beings not so repulsive nor so malignant as those described in the New Testament.

2. Another observation presents itself in regard to the comparative malignity or wickedness of these spirits. Some, probably, were comparatively harmless, such as the spirit of infirmity by whom Satan had bound a poor daughter of Abraham eighteen years (Luke xiii. 11-16); or the blind and dumb demoniac (No. 3), whose only sufferings appear to have been the inability to see and speak. A difference in wickedness is expressly asserted in the case of the demon who took seven other spirits, *more wicked than himself*, to the house he had previously left; and in the case of the demoniac whom the disciples could not cure, we have a fearful instance, not only of the desperate malignity of a particular kind of demon, but of his power to resist all efforts to expel him, unless accompanied by great faith as well as fasting and prayer.

3. It would appear, in the more violent cases of demoniacal possession (and it may be more or less in all) the attacks come on in fits, after intervals of comparative repose. In that remarkable case to which we have just referred, we find the father saying, "Lo, a spirit *taketh* him, and he *suddenly* crieth out; and it teareth him that he foameth again; and, bruising him, hardly *departeth from him*" (Luke ix. 39); and again, "Whosoever he *taketh* him, he teareth him; and he foameth, and gnasheth with his teeth, *and pineth away*" (Mark ix. 18). We

have also indirect evidence of these alternations in the case of Legion : "He had often been bound with fetters and chains" (Mark v. 4), evidently when prostrated by exhaustion after the fits ; "but oftentimes the demons *caught him*" (Luke viii. 29), and then "the chains were plucked asunder by him, and the fetters broken in pieces" (Mark v. 4).

4. We next observe the symptoms which these possessions exhibited :—*First*, There were hatred and enmity towards mankind, living without clothes night and day in the mountains, or dwelling among the tombs—"exceeding fierce, so that no man might pass that way." *Second*, There was fear and antagonism towards God and Christ : "What have I to do with thee?" "Art thou come to destroy us?" "Art thou come to torment us before the time?" "I adjure thee by God, that thou torment us not." *Third*, There was passive misery, exhibited in howling, even when the spirit was dumb ; wallowing on the ground, foaming, gnashing the teeth. *Fourth*, There was extreme violence of action. One was driven into the wilderness—no man could tame him ; and the swine into which the legion entered ran violently down into the sea. *Fifth*, There was malignant cruelty towards the person possessed. Nearly all of the victims appear to have been "sorely vexed"—one was in the habit of cutting himself with stones ; another was thrown down, and torn and bruised, besides being oftentimes cast into the fire and into the water, that he might be destroyed. And *sixth*, It appears that when the devils were cast out, the immediate effect in two cases was exhaustion. The daughter of the Canaanitish woman, although made whole at the very moment when our Lord said, "The demon is gone out of thy daughter," was so prostrated, that when the mother

arrived at her own house, she found that the demon had indeed gone out, but her daughter was "laid upon the bed." And again, when our Lord cast out the malignant demon from the boy, we are told, "he was as one dead, insomuch that many said, He is dead."

5. A remarkable doctrine is brought out regarding what may be called the physical constitution of these unclean spirits. They were able to occupy the same body, or nervous system, in considerable numbers. Besides the proper spirit of the man himself, not only do we find one demon sharing or disputing the habitation or government of the body, but in the case of Mary Magdalene, seven demons; in another case, eight; and in a third, not fewer than two thousand. It is interesting to observe the physiological effects produced by the concentrated spiritual influence of these demons, first on the man, and afterwards on the two thousand swine.

6. The circumstance that they were able to possess the nervous system of the swine, leads us also to conclude that if the nervous system of the lower animals be so constructed as to be capable of receiving impressions from spirit, there is probably some spiritual substance connected with the lower animals, though it be not capable of separate existence.

7. We are informed that the demons earnestly desired that Christ would not send them out into the deep, but allow them to enter into the swine. In this manner we observe that there is some kind of gratification enjoyed by a spirit in the habitation of a body. It desires not to be unclothed, but to be clothed upon. This is illustrated in the parable of the unclean spirit, which, when it went forth from the man, is said to have walked in dry places, like a wanderer in a thirsty, barren land. On return-

ing, however, to its old habitation, it took with it seven other spirits, and they entered and dwelt there. This natural appetite for a bodily tabernacle may probably proceed from one of two causes: either that the functions of the spirit cannot rightly be exercised, except upon, or by means of, a nervous system; or because the incubation of a nervous system provides some kind of nourishment or vitality elaborated by the body, without which possibly the spirit may lapse into a dormant or suffering state.

CHAPTER XXIV.

DEMONIACAL INSPIRATION.

ANOTHER kind of spiritual possession is prophetic ecstasy, or inspiration. It does not appear to differ very much in its nature from simple possession, perhaps not at all, except in the disposition of the indwelling spirit and the periods of its manifestation.

There does not seem to be any malevolence exhibited by the demon in the transports into which the prophet is thrown; and although there may be a peculiarity of constitution which makes him more susceptible of spiritual influence than others, it appears as if there must be some sort of consent, or even solicitation, on his part to permit or induce the spirit to deliver his responses or manifest his presence.

It is the fashion of the present day to ascribe to imposture or fanaticism all pretences to spiritual manifestation of whatever kind, and it is somewhat remarkable that this Sadducean philosophy is most in fashion among scientific men. This is to be accounted for, not by any natural tendency which the inductive philosophy has towards materialism, but by the lingering influence of the old *a priori* method of disposing of a question, not by impartially balancing the evidence, but by anticipating a conclusion, and then endeavouring to explain the phenomena in accordance with it.

It is by no means improbable that many, perhaps the great majority of pretenders to inspiration, either demoniacal or divine, were and are impostors or fanatics; but it does not follow that all of them must be included in the same category. We may indeed believe that Divine inspiration ceased at the close of the apostolic age; but it would be difficult to show that demoniacal inspiration had any canonical period, or that any age has been exempt from its influence.

If soothsaying be an imposture rather than in its own nature a crime, Scripture certainly does not say so, but on the contrary, speaks as if there were only too much reality in the profession. Perhaps the most remarkable instance of this species of demoniacal influence is that recorded in Acts xvi. 16 :—

And it came to pass, as we went to prayer, a certain damsel possessed with a spirit of divination (*πνεῦμα Πύθωνος*) met us, which brought her masters much gain by soothsaying.

The same followed Paul and us, and cried, saying, These men are the servants of the Most High God, which shew unto us the way of salvation.

And this she did many days. But Paul, being grieved, turned, and said to the spirit, I command thee, in the name of Jesus Christ, to come out of her. And he came out the same hour.

And when her masters saw that the hope of their gains was gone, they caught Paul and Silas, and drew them into the market-place unto the rulers.

It is evident, in regard to this woman, that there was here no deception or collusion. The woman and her masters professed that she had a spirit of divination; this fact was not denied, but acknowledged by Paul; the spirit (like others mentioned in the Gospels) bare testimony to the truth; Paul, in expelling him, exorcised him in the name of Jesus Christ; and, lastly, the spirit came out the same hour, so that the hope of her masters' gains was gone.

The name given to this spirit (for it is called a spirit of

Python) invests this narrative with a deep interest, inasmuch as it forms a sort of connecting link between the heathen oracles of profane history and the demoniacal possessions described in the New Testament. The name Python is not a Scripture name, but, like Jupiter and Mercury, mentioned in Acts, belongs to the heathen mythology of Greece and Rome; and therefore we must turn to the classic writers of those countries for an explanation. From them we learn that the spirit of Python is no other than the Pythian Apollo, whose temple was at Delphi, not very far distant, and whose inspirations there brought much gain to the priests: in other words, the Pythian Apollo was the great spirit of divination or sooth-saying, celebrated throughout the heathen world, and his responses were given by means of a woman, who was called the Pythia. The following is the account given by Lempriere in his Classical Dictionary:—

“PYTHIA, the priestess of Apollo at Delphi.—She delivered the answer of the god to such as came to consult the oracle, and was supposed to be suddenly inspired by the sulphureous vapours which issued from the hole of a subterraneous cavity within the temple, over which she sat. Vapour was inhaled by the priestess, and at this divine inspiration her eyes suddenly sparkled, her hair stood on end, and a shivering ran over all her body. In this convulsive state she spoke the oracles of the god, often with loud howlings and cries, and her articulations were taken down by the priest and set in order. Sometimes the spirit of inspiration was more gentle, and not always violent; yet Plutarch mentions one of the priestesses, who was thrown into such an excessive fury, that not only those that consulted the oracle, but also the priests that conducted her to the sacred tripod, and attended her

during the inspiration, were terrified, and forsook the temple; and so violent was the fit, that she continued for three days in the most agonising situation, and at last died. The Pythia, before she placed herself on the tripod, used to wash her whole body, and particularly her hair, in the waters of the fountain Castalia, at the foot of Mount Parnassus. She also shook a laurel-tree that grew near the place, and sometimes eat the leaves with which she crowned herself. The priestess was originally a virgin, but the institution was changed when Echebrates, a Thessalian, had offered violence to one of them, and none but women above the age of fifty, were permitted to enter upon the sacred office. They always dressed in the garments of virgins, to intimate their purity and chastity; and they were solemnly bound to observe the strictest laws of temperance and chastity, that neither fantastical dresses nor lascivious behaviour might bring the office, the religion, or the sanctity of the place into contempt. There was originally but one Pythia, besides subordinate priests, and afterwards two were chosen, and sometimes more. The most celebrated of these is Phemonoe, who is supposed by some to have been the first to give oracles at Delphi. The oracles were always delivered in hexameter verses, a custom which was some time after discontinued. The Pythia was consulted only one month in the year, about the spring. It was always required that those who consulted the oracle should make large presents to Apollo, and from thence arose the opulence, splendour, and magnificence of that celebrated temple of Delphi. Sacrifices were also offered to the divinity, and if the omen proved unfavourable, the priestesses refused to give an answer. There were generally five priests who assisted at the offering of the sacrifices, and

there was also another, who attended the Pythia, and assisted her in receiving the oracle."

With this historical explanation, we have no difficulty in understanding the circumstances of Paul's miracle in exorcising the woman. As the event did not take place in Delphi, and as the spirit was called, notwithstanding, a spirit of Python, which, according to the Greek idiom, may be as well translated a Pythian spirit (indeed, some readings give us *πνεῦμα πύθωνα*), we must conclude that this woman was possessed in exactly the same manner as the Pythoness at Delphi, although she was not connected with that institution. The description given by Luke corresponds sufficiently with the statements collected by Lempriere to shew that the one was related to the other in something more than the name; and if so, we are not warranted in supposing that the oracle at Delphi was a trick or an imposture: it was a demoniacal inspiration, and the responses which were given were the deliverances of demons. The opinion is confirmed so far by the fact, that, at least upon the one occasion mentioned above by Lempriere, on the authority of Plutarch, the possession was very much akin to the demoniacal possessions described in the New Testament.

Paul himself appeared to entertain no doubt regarding the demoniacal nature of the heathen gods; for although he says that an idol (*εἰδωλον*), or image, is nothing in the world (1 Cor. viii. 4), yet he affirms (1 Cor. x. 20), that the things which the Gentiles sacrifice, they sacrifice to demons, and not to God. The following passages in the Old Testament present the same explanation:—

Lev. xvii. 7. And they shall no more offer their sacrifices unto devils, after whom they have gone a whoring.

Deut. xxxii. 17. They sacrificed unto devils, not to God; to gods

whom they knew not, to new gods that came newly up, whom your fathers feared not.

2 Chron. xi. 15. And he ordained him priests for the high places, and for the devils, and for the calves which he had made.

Ps. cvi. 37. Yea, they sacrificed their sons and their daughters unto devils.

Even the heathens themselves identify their gods with demons, thus (Herodotus l. iv.):—

Ye Scythians ridicule us because we celebrate the Bacchanals, and the god possesses us (*ὁ θεὸς λαμβάνει*), but now the same demon (*οἷτος ὁ δαίμων*) hath taken possession of your king.

The following passages of Scripture also appear to bear upon this subject :—

Thou shalt not suffer a witch to live (Ex. xxii. 18).

A man also, or woman, that hath a familiar spirit, or that is a wizard, shall surely be put to death (Lev. xx. 27).

Neither shall ye use enchantment, nor observe times (Lev. xix. 26).

The soul that turneth after such as have familiar spirits, and after wizards, to go a whoring after them, I will even set my face against that soul, and will cut him off from among his people (Lev. xx. 6).

There shall not be found among you any that maketh his son or his daughter to pass through the fire, or that useth divination, or an observer of times, or an enchanter, or a witch, or a charmer, or a consulter with familiar spirits, or a wizard, or a necromancer. For all that do these things are an abomination unto the Lord: and because of these abominations the Lord thy God doth drive them out from before thee (Deut. xviii. 10-12.)

And when Saul enquired of the Lord, the Lord answered him not, neither by dreams, nor by Urim, nor by prophets. Then said Saul unto his servants, Seek me a woman that hath a familiar spirit, that I may go to her, and enquire of her. And his servants said to him, Behold, there is a woman that hath a familiar spirit at En-dor. And Saul disguised himself, and put on other raiment, and he went, and two men with him, and they came to the woman by night; and he said, I pray thee, divine unto me by the familiar spirit, and bring me him up whom I shall name unto thee. And the woman said unto him, Behold, thou knowest what Saul hath done, how he hath cut off those that have familiar spirits, and the wizards, out of the land: wherefore then layest thou a snare for my life, to cause me to die? And Saul sware to her by the Lord, saying, As the Lord liveth, there shall no punishment happen

to thee for this thing. Then said the woman, Whom shall I bring up unto thee? And he said, Bring me up Samuel. And when the woman saw Samuel, she cried with a loud voice: and the woman spake to Saul, saying, Why hast thou deceived me? for thou art Saul. And the king said unto her, Be not afraid: for what sawest thou? And the woman said unto Saul, I saw gods ascending out of the earth. And he said unto her, What form is he of? And she said, An old man cometh up; and he is covered with a mantle. And Saul perceived that it was Samuel, and he stooped with his face to the ground, and bowed himself. And Samuel said to Saul, Why hast thou disquieted me, to bring me up? (1 Sam. xxviii. 6).

And they caused their sons and their daughters to pass through the fire, and used divination and enchantments (2 Kings xvii. 17).

And Manasseh made his son pass through the fire, and observed times, and used enchantments, and dealt with familiar spirits and wizards (2 Kings xxi. 6).

And Manasseh caused his children to pass through the fire in the valley of the son of Hinnom; also he observed times, and used enchantments, and used witchcraft, and dealt with a familiar spirit, and with wizards (2 Chron. xxxiii. 6).

And when they shall say unto you, Seek unto them that have familiar spirits, and unto wizards that peep and that mutter: should not a people seek unto their God? for the living to the dead? (Isa. viii. 19).

They (punishments) shall come upon thee in their perfection for the multitude of thy sorceries, and for the great abundance of thine enchantments. Stand now with thine enchantments, and with the multitude of thy sorceries. Thou art wearied in the multitude of thy counsels. Let now the astrologers, the stargazers, the monthly prognosticators, stand up and save thee (Isa. xlvii. 9, 12, 13).

Therefore hearken not ye to your prophets, nor to your diviners, nor to your dreamers, nor to your enchanters, nor to your sorcerers: for they prophesy a lie unto you (Jer. xxvii. 9, 10).

And I will cut off witchcrafts out of thine hand; and thou shalt have no more soothsayers (Micah v. 12).

I will be a swift witness against the sorcerers (Mal. iii. 5).

But there was a certain man, called Simon, which beforetime in the city used sorcery, and bewitched the people of Samaria (Acts viii. 9).

When they had gone through the isle unto Paphos, they found a certain sorcerer, a false prophet, a Jew, whose name was Bar-jesus (Acts xiii. 6).

Many of them also which used curious arts, brought their books together, and burned them before all men: and they counted the price of them, and found it fifty thousand pieces of silver (Acts xix. 19).

Now the works of the flesh are manifest,—idolatry, witchcraft (Gal. v. 19, 20).

Sorcerers shall have their part in the lake (Rev. xxi. 8).

For without are dogs and sorcerers (Rev. xxii. 15).

I will go forth, and I will be a lying spirit in the mouth of all his prophets (1 Kings xxii. 22).

Saul had put away those that had familiar spirits, and the wizards, out of the land (1 Sam. xxviii. 8).

Thou shalt be brought down, and shalt speak out of the ground, and thy speech shall be low out of the dust, and thy voice shall be, as of one that hath a familiar spirit, out of the ground, and thy speech shall whisper (*Hebrew*, peep or chirp) out of the dust (Isa. xxix. 4).

Moreover, the workers with familiar spirits, and the wizards, and all the abominations, did Josiah put away (2 Kings xxiii. 24).

I will destroy the counsel thereof: and they shall seek to the idols, and to the charmers, and to them that have familiar spirits, and to the wizards (Isa. xix. 3).

The scientific value of these passages is much increased by the account given of the Pythoness in the Acts of the Apostles; chap. xvi. 16, which establishes the following propositions:—

First, Soothsaying and possession, or inspiration by a familiar spirit, is a reality and not necessarily an imposture. The damsel really had a familiar spirit, and Paul really cast him out:

Second, By means of the familiar spirit the soothsayer is able to communicate information, known to the demon, though it may not be known to men. This is proved, not so much by the damsel crying out, "These men are the servants of the most high God, which shew unto us the way of salvation," as by the lucrative business which her masters had established by her means, and its entire failure when the spirit was cast out. "Her masters saw that the hope of their gains was gone," whereas, previously, she brought them much gain by soothsaying: and,

Third, The name given to this spirit, "a spirit of

Python," and the place where the event occurred, viz, Greece, identify this instance of inspiration with the other heathen oracles of Greece, particularly the Delphic oracle and its Pythonesses.

If these propositions be established, the other passages which refer to soothsaying and familiar spirits assume a scientific importance which they would not otherwise possess. Instead of having reference to impostures and superstitions which had no foundation in reality, they stand out before us as evidence of the existence of real crimes; so that the details which are given regarding them may be considered as truly descriptive of their nature and their objects. As regards the other crimes of charming, enchanting, necromancy, prognostication, and sorcery, we have no means of knowing whether or how far they are connected with demoniacal agency, and how far they were fictitious—the products of deceiving and deceived minds. No doubt, the demons, with whom intercourse was cultivated, did know many things, and guessed many things, which superior knowledge, and even moderate ingenuity and foresight, might pass off as pretended prophecy; there might even be physical effects which demons were able to produce, the nature of which we cannot understand, so long as we do not understand the nature and functions of spirits. All this might be so combined and played off by wicked men, in concert with wicked spirits, as to deceive and impose upon an ignorant and depraved population. But to conclude that there must be in the case any such thing as miraculous foreknowledge, or magic, or astrology, as we understand them, would be to impose upon these passages an interpretation which they do not necessarily bear.

We must next observe that not every one was capable of being a soothsayer or prophet—a peculiarity of constitution or temperament being required for that purpose. In some, this peculiarity might be natural, in others, it might be acquired; in all, it appears to have been more or less subject to the will, whether it should be exercised or not, otherwise the punishment of death would have been not only barbarous but futile.

As the name *familiar* spirit (from *familiaris*, a household servant,) implies service, and also in some degree subjection, we are to understand that, generally speaking, the spirit did not inspire the soothsayer, nor give any response, unless he were invited or solicited to do so; for this purpose, of course, some act or process was necessary, and on this act or process being completed, the inspiration followed.

It was evidently a knowledge of these methods that constituted the art and literature of soothsaying—shewing how the intending soothsayer might render himself more susceptible of demoniacal influence, and also how he might invite (or, it may be, command) the services of particular demons. No doubt, there must have been great proficient in the art, and many books must have been written upon the subject. May we not suppose that the books burned by the Ephesian converts (Acts xix. 19) were of this kind? for had the “curious arts” which were so assiduously cultivated in Ephesus been merely feats of legerdemain and imposture, their converted owners would rather have published them to the world, and thus have exposed and exploded the conspiracy? The burning of these books proved that a knowledge of these arts would not abolish them, but rather spread the contagion of their influence.

The state of the soothsayer, while under inspiration, appears to have been one of great excitement and even frenzy. The imaginative faculties were exalted, and the utterances highly figurative and poetical. This, indeed, appears to have been, to some extent, the natural origin of poetry, which was an imitation of spiritual inspiration. The Latin word *Vates* means both a prophet and a poet, and probably there was, at one time, something more than fiction in the customary invocation of the muse or the god of poetry. It is an interesting circumstance that the responses of Apollo at Delphi were, at one time, always delivered in hexameter verses—not very polished, and not always intelligible. Even the heathen critics remarked that the god of poetry was decidedly the worst poet of the age, and it was in consequence of this fact becoming somewhat notorious, that the practice was discontinued.

CHAPTER XXV.

SPIRITUAL VISION—ELISHA AND PAUL.

THE only other class of spiritual phenomena which we have to notice is that rare and peculiar power of the spirit, by which it is enabled to become acquainted with external objects without the aid of the bodily senses.

The prophets, or seers, received impressions, but in almost all cases these impressions could be received from spirit only: in two instances, at the most, is there any evidence of impressions being received from external nature by the spirit of the seer—these were Elisha, and probably also the Apostle Paul. Elisha was remarkably gifted in this way; at the beginning of his career this faculty appears in his perception of the thoughts of his master: "Go," said God to Elijah, "and anoint Elisha to be prophet in thy room. . . . So he departed thence, and found Elisha the son of Shaphat, who was ploughing with twelve yoke of oxen before him, and he with the twelfth: and Elijah passed by him, and cast his mantle upon him. And he left the oxen, and ran after Elijah, and said, Let me, I pray thee, kiss my father and my mother, and then I will follow thee. And he said unto him, Go back again: for what have I done to thee?" (1 Kings xix. 19, 20).

We have not, perhaps, in this narrative an undoubted proof of spiritual perception; not to speak of the cir-

cumstance that what he spiritually perceived was the movings of Elijah's spirit, and not external objects, it is not quite certain that he understood more than might be implied by the casting of the mantle upon him. It is the subsequent history of the prophet that excites the suspicion that this was an earnest of his future spiritual discernment, when a *double* portion of Elijah's spirit was to rest upon him. He alone, of all the Old Testament prophets, appears to have been endowed with this wonderful faculty.

It was more undoubtedly exhibited in the affair of Naaman the Syrian, when Gehazi followed the chariot to obtain money fraudulently in the name of his master. Elisha said, "Went not mine heart with thee, when the man turned again from his chariot to meet thee?" From this it appears that Gehazi's conduct was not revealed to Elisha by a third party, but that it was seen by Elisha himself.

After this he was present in spirit at the consultations of the king of Syria in Damascus, and revealed his plans to the king of Israel, who was thus enabled to defeat them. "Therefore the heart of the king of Syria was sore troubled for this thing," feeling assured that some of his own courtiers must have been in correspondence with the enemy: "Will ye not shew me," said he, "which of us is for the king of Israel? And one of his servants said, None, my lord, O king; but Elisha, the prophet that is in Israel, telleth the king of Israel the words that thou speakest in thy bed-chamber" (2 Kings vi. 8).

After this, also, Elisha appears to have observed the coming of the king of Israel's messenger to arrest him; the king himself being immediately behind: "Elisha sat in his house, and the elders sat with him; and

the king sent a man from before him : but, ere the messenger came to him, he said to the elders, See ye how this son of a murderer hath sent to take away mine head ? Look, when the messenger cometh, shut the door, and hold him fast at the door : is not the sound of his master's feet behind him ? And, while he yet talked with them, behold the messenger came" (2 Kings vi. 32).

Paul also gives some indication of this extraordinary faculty—first, in his Epistle to the Corinthians (1 Cor. v. 4) : " For I verily, as absent in body, but present in spirit, have judged already, as though I were present, concerning him that hath so done this deed, in the name of our Lord Jesus Christ, when ye are gathered together, and my spirit, with the power of our Lord Jesus Christ, to deliver such an one unto Satan."

Also, in his second Epistle to the same Church, he says (chap. xii. 1-4), " It is not expedient for me doubtless to glory. I will come to visions and revelations of the Lord. I knew a man in Christ about fourteen years ago, (whether in the body, I cannot tell ; or whether out of the body, I cannot tell : God knoweth,) how that he was caught up into paradise, and heard unspeakable words, which it is not lawful for a man to utter. Of such an one will I glory ; yet of myself I will not glory, but in mine infirmities."

The circumstance that he could not tell whether it was in the body or out of the body that he heard these words, proves, that whatever were the facts of the case, he at least possessed the faculty of hearing by his spirit words spoken in paradise, while his body was present on earth, whether the faculty was exercised in this particular instance or not. He would not by inspiration express an

uncertainty regarding a thing which was impossible in its nature.

We may, perhaps, also class under this division the incident which followed Elisha's perception of the king of Syria's designs. When the king of Syria sent horses and chariots, and a great host to Dothan, to bring Elisha prisoner to Damascus, they came by night, and compassed the city round about:

"And when the servant of the man of God was risen early, and gone forth, behold, an host compassed the city both with horses and chariots. And his servant said unto him, Alas, my master! what shall we do?"

"And Elisha prayed, and said, Lord, I pray thee, open his eyes, that he may see. And the Lord opened the eyes of the young man, and he saw and beheld the mountain was full of horses and chariots of fire round about Elisha."

In the case of Elijah and the Apostle Paul, they were able to see with their spirit *things visible to the bodily eye*, though far removed and hidden from it. In this case, the spirit of the young man perceived not visible things, but invisible. The spirit in its independent state (that is, not receiving impressions from the body) must be able to perceive spiritual objects *invisible to the bodily eye*; and then, when the spirit is abnormally enabled to perceive them, it may excite the imaginative faculty, according to the principles explained in the preceding chapter. Thus, if the spirit were enabled to observe danger invisible to the bodily eye, images of terrors would most likely be imagined, and these images would shape themselves according to previous impressions or experiences. When, on the contrary, the spiritual eyes of the servant were opened to discern the safety of the prophet, the imagina-

tive faculty would be excited, and as he had seen horses and chariots of the enemy, he would now see horses and chariots of fire surrounding Elisha, to guard and protect him.

Perhaps this explanation may hereafter be found to be erroneous. It is offered merely as a suggestion which might most easily harmonise the statements of Scripture with the teachings of science. We cannot well suppose that horses and chariots of fire were the real protection of the prophet; the vision, therefore, was most likely to picture the truths on his spirit, as in what is called Phreno-mesmerism.

CHAPTER XXVI.

THE SOUL, OR PSYCHE.

WHEN Paul prayed for the Thessalonians, that the very God of peace would sanctify them wholly, and that their whole *spirit*, and *soul*, and *body* should be preserved blameless unto the coming of the Lord Jesus Christ (1 Thess. v. 23), he evidently intimated that the *soul* and the *spirit* were not the same, because he distinguishes the one from the other. Nor is this the only passage in which they are spoken of as distinct substances in the human person; for the author of the Epistle to the Hebrews (iv. 12), speaking of the Word of God, says, that He "is quick, and powerful, and sharper than any two-edged sword, piercing even to the dividing asunder of the *soul* and *spirit*, and of the joints and marrow, and is a discernor of the thoughts and intents of the heart."

The popular notion regarding the soul is, that it is that immaterial part of man that lives after death,—that goes to heaven or hell, according as the person did or did not believe in Christ,—and that will, at the resurrection, be again united to the body, to spend an eternity of happiness or woe. If the question be asked, And what becomes of the spirit after death? the answer would probably be, "The soul is the spirit, and the spirit is the soul."

But the soul is not the spirit, and the spirit is not the

soul; nor have we any warrant in the Word of God for supposing that they are the same. The soul is never spoken of in the same manner as the spirit, and the spirit is never spoken of in the same manner as the soul. So true is this that, although we may suppose that there is no difference, we should be startled were we to use the one instead of the other. For example, how strange would it appear if we were to speak of a man losing his spirit (Matt. xvi. 26), or to say, that there were added to the Church three thousand spirits? (Acts ii. 41). Still more startling would it be to use the word soul for spirit, saying, He saw the soul of God descending like a dove, and lighting upon him (Matt. iii. 16); They were terrified and affrighted, and supposed that they had seen a soul (Luke xxiv. 37); Ye know not what soul ye are of (Luke ix. 55); In the name of our Lord Jesus Christ, when ye are gathered together, and my soul, with the power of our Lord Jesus Christ (1 Cor. v. 4); When the unclean soul had torn him (Mark i. 26).

When we examine the passages in which the words *soul* and *spirit* occur, we at once discover that in Scripture they are altogether different in their meaning, and cannot be used the one for the other. But the distinction is still more marked in the original Greek, because the word *psyche* is frequently translated in our English New Testament, not *soul*, but *life*; so that it is by a combination of the two ideas that we must obtain the true meaning of the word. It must be observed, however, that there are two Greek words which are translated *life* in the English New Testament; these are *zoe* and *psyche*, which have very different meanings, although it is not very easy to define them. When Scripture speaks of life as *zoe*, it does not refer to the vitality of the body, but to life as a

glorious and immortal principle. Thus, when John says, "In him was life," the word *zoe* is used: "In him was *zoe*." If the word *psyche* had been used, the meaning would have been altogether different. It would merely have asserted that he was alive, or that there was a soul within him. Again, when it is said, "He gave his life a ransom for many," the word used is necessarily *psyche*, because it was His bodily life that He surrendered. Had the word *zoe* been used, it would have meant that He gave up His immortality, or spiritual life, which He had as God. God has the *zoe* life, but not the *psyche* life—because the *psyche* life is organic life.

He that findeth his *psyche* shall lose it (Matt. x. 39).

The good shepherd giveth his *psyche* for the sheep (John x. 11).

Is not the *psyche* more than meat? (Luke xii. 23).

Take no thought for your *psyche* (Matt. vi. 25).

Is it lawful to save the *psyche*, or to kill? (Mark iii. 4).

In all these and similar passages, the Greek word *psyche* is translated life, and is the same word that is translated *soul* elsewhere. We, therefore, conclude that the true meaning of the word must be found in a combination of the two ideas. It is not life as a state, but life as a substance; not merely life, but the *anima* or soul which causes it, and which leaves the body at death. Such passages as those which follow, prove that the soul is more than the mere state of life, and something distinct also from the spirit:—

Thou wilt not leave my *psyche* in hell.

Fear not them which kill the body, but are not able to kill the *psyche*: but rather fear him which is able to destroy both *psyche* and body in hell (Matt. x. 28).

Piercing even to the dividing asunder of the *psyche* and spirit (Heb. iv. 12).

A secondary sense has been given to the word soul, implying tender affection or earnest longing, inasmuch as life requires to be nourished, and if deprived of necessary food would die. The soul is, therefore, said to long for certain things, as if they were its food; and being thus represented as that which hungers or loathes, it came by a natural transition to signify the seat of all our desires and feelings :—

He filleth the hungry soul with goodness (Ps. cvii. 9).

To satisfy the soul when hungry (Prov. vi. 30).

My soul longeth for the Lord (Ps. lxxxiv. 2).

There is yet another idea conveyed sometimes when the word is used by the sacred writers. As the soul bears the same relation to the life, that the spirit does to the mind, they occasionally employ the word to express the well-being of the person, and the subject of salvation :—

Draw near unto my soul, and redeem it (Ps. lxxix. 18).

God will redeem my soul from the power of the grave (Ps. xlix. 15).

What is a man profited, if he shall gain the whole world, and lose his own soul? or what shall a man give in exchange for his soul? (Matt. xvi. 26).

Upon the whole, then, we are to understand that the soul and spirit form, as it were, a quality in the immaterial part of our nature, and together constitute the personality which inhabits the body. If we were to say, that the soul is to the spirit what the body is to both, we should say what is probably something like truth without being exactly true. If the soul, in connection with the body

and spirit, provides for the nourishment and energy of both, as we shall endeavour to shew, it seems not unlikely that when it accompanies the spirit alone after death, its functions may be continued as regards the spirit, in a manner of which we can at present form no conception, although, perhaps, when we do know it, it will appear simple enough.

CHAPTER XXVII.

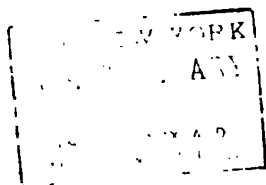
PHYSIOLOGY OF THE SOUL—THE SYMPATHETIC NERVE.

WE have already seen that the brain and spinal nerves are the chief residence of the spirit, and that by means of the two columns which pass upwards to the brain, the spirit receives intelligence from external nature, and is able to act upon external nature by means of the muscles. But there is another system of nerves in the body, quite distinct from the cerebro-spinal system, which neither conveys impressions to the spirit nor volitions from the spirit, but deals exclusively with the interior arrangements of the body. This is what is called the great sympathetic nerve, or ganglionic system. The cerebro-spinal system is, as it were, the husband, who attends to business and deals with the world, who fights for his wife and family when they are in danger, and provides for their sustenance by collecting supplies. The ganglionic system, on the other hand, is like the wife, who gives herself entirely to domestic duties, receiving the supplies provided by her husband, and preparing them for food, keeping the house in order, sweeping out the refuse, and patching, mending, and nursing wherever accident or disease may render it necessary or desirable.

This great system of nerves is distributed over the trunk, without having any great central mass like the brain: it has, however, numerous patches, or ganglia,



THE SYMPATHETIC NERVE.
THE RESIDENCE OF THE SOUL OR PSYCHE.



as they are called, in different parts, in which the nerve is connected with small masses of nerve cells, so that whatever may be the use of the brain in the cerebro-spinal system, these ganglia perform corresponding duties in this. The advantage of this arrangement is evident: in the cerebro-spinal system, unity of thought and concentration of attention are necessary, therefore a single brain forms the metropolis of its operations; but in the other system, where the operations are so numerous and so varied, and where all must be going on at the same time, instead of a single brain the cares of office are distributed among many ganglia, which, like the municipal courts of a country, adapt their labours to local circumstances, and perform their subordinate functions without having to engage the attention of the central government. The ganglionic system may be said to attend to all the household work of the body, the secretion of the glands, the preparation of the food, and the formation of the tissues, besides co-operating with a branch of the cerebro-spinal system (the vagus) in the pulsation of the heart, the breathing of the lungs, and the action of the stomach. These are but part of its duties, so that we may form some idea of the endless variety and amazing multiplicity of its functions.

There is one other peculiarity which distinguishes the ganglionic system of nerves. It never rests nor grows weary from the cradle to the grave. In regard to the other system it is not so; it requires not only to rest every night, but to obtain relief from the intensity of labour every seventh day, as well as at longer intervals; but the sympathetic nerve is always on the stretch, its silver cord is never relaxed, until the golden bowl is broken, and the pitcher is broken at the fountain (Eccles. xii. 6).

We cannot but admire the wisdom of these arrangements, by which the mind is relieved of all care over those important functions, which require to be continually in action. They go on under the influence of the ganglionic system, without troubling the mind in regard to any of them: it is, therefore, left free to perform its own duties, which otherwise would be impossible. There are, indeed, several important exceptions to this rule, in the case of those actions which might become useful under the guidance of the mind. Thus, the lungs may be made useful for other purposes besides aerating the blood, such as speaking, blowing, &c., therefore the mind is allowed to exercise a certain amount of power over them; but even this is limited. The sympathetic nerve will allow the use of the lungs for speaking, &c., only on condition that the breathing shall not be unduly interrupted; and when the mind has finished all that was wanted, the sympathetic nerve resumes its control, and conducts the operation of breathing, without the mind being conscious of the act. A somewhat similar arrangement has been permitted in regard to a few other economic functions of the body, but only in so far as an advantage may be gained by their being placed for a season under the direction of the mind. Cases have even occurred in which the mind had power over the action of the heart, so as voluntarily to produce a state of body in many respects the same as death; the heart ceased to beat, and the person continued in that state for a considerable length of time, and then revived again. These cases have been well authenticated, though, happily, they are rare; and they may be explained by supposing that some monstrosity or malformation of the nervous system existed, so that the sympathetic nerve became, to a certain extent, subject to

the spirit's volitions, contrary to the usual economy of the system.

Let us now consider for a little the ground which we have gone over. We find two great nervous systems, which divide between them the vitality and government of the body: one of them is in connexion with, and inhabited by, the spirit; and the question arises, What is the tenant of the other? The nervous matter is evidently a medium of communication between the body and the spirit in the cerebro-spinal system; does it perform no similar duty in the ganglionic? Even though Scripture had been silent on the subject, we should have inferred that the functions of both, though different, were similar; and therefore we conclude that, if the cerebro-spinal system be the residence of the spirit, the ganglionic system must be the residence of the soul.

In the accompanying illustration the sympathetic nerve is represented as a double column running parallel with the spine, and having little swellings, or ganglia, corresponding with each rib, or rather with each of the vertebræ. The dark shading represents its ramifications spread over the stomach and intestines, but there it ends. It does, indeed, send branches into the cerebro-spinal system, but as it cannot be traced, as a distinct tissue, into either the arms or the limbs, we cannot affirm that the sympathetic nerve extends beyond the trunk.

Supposing the soul then to have its residence in this nerve, the question arises, Does it not reside also in the arms and limbs? In attempting to answer this question, we must keep in mind that, whatever be the function of the sympathetic nerve, the organising life-power that first produces, and then applies organic force, not only inhabits every living tissue, but works differently in every part,

because every cell acts in obedience to its control. This life-power is the soul, and it is only because we find the functions of the sympathetic nerve corresponding with its functions, that we suppose the one to be tenanted by the other. There are, therefore, two alternatives open to us. We may either suppose that the white tissues of the cerebro-spinal system, after receiving branches from the sympathetic nerve, are able to transmit and apply the forces peculiar to the latter, and thus become practically its continuation over the whole body; or we may suppose that the soul resides in the living tissues of the whole body, and that the sympathetic nerve is merely its head-quarters—the source of its energies, perhaps, and medium of its more powerful actions.

We must keep in mind that nervous matter is not always necessary for the existence and action of animal life: this is proved by the organisation of the lower animals: it seems to be necessary only for the more rapid or the more perfect performance of its functions. For this reason we may suppose that both the spirit and the soul reside in the whole body, and that the two nervous systems are, as it were, the government offices, the railway and the telegraph of their little kingdom.

CHAPTER XXVIII.

MESMERISM AND SPIRIT-RAPPING.

It is well known—and physicians acknowledge the fact—that all cures must be effected by the operations of nature itself. It is true that in some cases, such as the swallowing of poison, and accidents or diseases in which surgical operations are necessary, nature, if left to itself, would not effect a cure; but, in general, the office of the physician is to remove every obstacle which would prevent the healthy action of the powers of nature, because it is upon these powers that all his hopes depend. And what are these healing powers of nature, but the natural action of the psyche in renovating the materials of the body, and supplying vital energy for the performance of its varied functions? When the body is in a state of health, the work of the psyche goes on, and the materials of the body are renovated without observation; so much so is this the case, that a consciousness of the psyche's action is almost a sure sign of disease; but when disease invades the system, or when a wound or a bruise disintegrates the tissues, the process of renewal is neither so easy nor so imperceptible as when all is well. For this reason, in old age the vital power may be sufficient to carry on the process of renewal in a state of health, but a broken limb or a severe contusion may prove too much, and nature, unaided, may sink under it. The reason is, that the vital

powers of the psyche are too feeble to accomplish the task of renovation. It becomes, therefore, an interesting question, whether the physician may not only remove obstacles to the right action of the psyche, but directly add to its power. This is a question which ought to be answered, not by reasoning, but by observation and experiment, and, to some extent, it has already been answered in the affirmative. The author does not pretend to any extensive acquaintance with what is called curative mesmerism; but there is one kind of mesmeric treatment (although it is not called by that name) which is more extensively practised than any other kind of cure, and that is, the relief afforded to pain by the application of the hand. It is an instinctive act, and there can be no doubt that it is, to a certain extent, efficacious. The efficacy of the application is evidently caused by the psychical power of the hand being added to the psychical power of the part that is injured. Should any of our readers happen to receive a blow or a bruise which causes him pain, let him try the experiment of applying both his hands, the one on the top of the other, and letting them remain, not only until the pain has somewhat abated (as is usually done), but for a quarter or half an hour, according to the severity of the accident. By so doing (and the experiment is a very safe and simple one), he will greatly hasten the cure, and the pain, which otherwise would probably have continued much longer, will have altogether ceased before the experiment is concluded.

It has often been remarked, also, that children, when they sleep with aged or infirm nurses, generally lose their health, and pine away without any visible disease, while the nurse whom they sleep with thrives and grows strong

at their expense. It seems to be a general principle, that the vital powers of different psyches, when brought together, tend to equilibrium; it happens, therefore, that where the vital energy of one psyche is deficient or over-tasked in producing a cure, the vital power of another psyche may be made available in order to make up the deficiency. In a recent case, which came under the author's notice, a patient, who had been bedridden for three years, and was unable even to put her feet to the ground, was cured in a fortnight by simple contact with a person who was in health. There were no passes made; all that was done was simply producing contact for about two hours each day. In two weeks the patient was able to walk without assistance, and has continued well ever since. This mode of cure should be called psychopathy; for, although it belongs to the class of phenomena called mesmerism, it is scarcely identical with its characteristic forms.

In regard to what are called mesmeric phenomena, the author does not wish to offer any opinion; there may be, and have been, many impositions, and a still greater number of fallacies and unintentional exaggerations perpetrated under the name, and yet there still remains a sufficient number of remarkable phenomena which cannot be explained by any other science. It, therefore, becomes the true philosopher to treat its pretensions with at least respect, until he has been able to draw a line between that which may be, and that which cannot be—a feat which the most experienced philosopher is always the least inclined to attempt. When a phenomenon presents itself, having the appearance of being opposed to what we have been accustomed to consider a well-established law, there is a disposition on the part of many to deny its exist-

ence, not because it wants authentication, but on the ground of its apparent inconsistency with law. This is a violation of the inductive system of philosophy, because the existence of the phenomenon must be judged of, not by its probability, but by the evidence which we obtain regarding it. If that evidence be satisfactory, and no counter-evidence presents itself to throw suspicion upon it, we must give it that measure of belief to which the evidence entitles it, and carefully inquire after more phenomena of a similar description. The unexpected phenomenon does not destroy our former opinions, it only adds to them, and every additional phenomenon, in the same direction, increases our knowledge, as well as defines the position and the character of the new fact.

It is in this way that some of our greatest discoveries have been made. When the perturbations of the planet Uranus were first observed, they were not denied on the pretended ground that they were contrary to known laws, although they appeared to be so. Adams and Leverrier knew this, and therefore they collected these apparent contradictions, in order to ascertain exactly their character; and, by doing so, discovered that they had a regularity of their own, and were caused by the gravitation of another planet, Neptune, whose existence was previously unknown.

The phenomena that are called mesmeric may at first sight appear to be contrary to law, but in reality they are not so. If it be true that the spirit and the brain are naturally fitted to one another, so that they give and receive impressions or impulses to and from one another; and if, moreover, alien spirits are capable of exercising their relative functions upon the nervous system of men, why should we conceive it impossible or contrary to law

that the spirits of living persons should be able to influence the nervous system of others? If it be true, also, that the soul is a substantive principle of life, by whose agency the healthful action of all the internal organs is maintained, why should it be considered impossible that the soul of one person should be able to stimulate the sympathetic nerves of another? These two classes of influence constitute a large portion of the peculiarities of mesmerism, and may be classified in the following manner:—

1. When the *spirit* of one person receives impressions from the *sensitive* nerves of another: as, when the mesmeriser puts salt into his mouth, unobserved by the person mesmerised, the latter feels the taste of the salt, and endeavours to spit it out; or, when the mesmeriser pricks himself with a pin, the mesmerised person feels the pain, and shrinks from the supposed infliction.

2. When the *spirit* of one person acts upon the *motive* nerves of another. This is illustrated when the mesmeriser is able to produce involuntary motions in the body of the person mesmerised, either by the force of his will, or by corresponding movements of his own body, unobserved by the mesmerised.

3. When the *soul* of one person is made to affect the *sympathetic* nerves of another. This is exemplified by the cures that are effected by means of passes, or contact by means of the hand.

There is another interesting question opened up by the mesmerist—whether the spirit is capable of receiving impressions from, and conveying impressions to external nature, without the intermediate agency of a nervous system? We must confess that we cannot, *a priori*, assert that this cannot be. The nervous tissue is matter; and if the spirit is able to impress and be impressed by the

nervous tissue, the correlation between spirit and matter is already established. It may be that nervous tissue is, more than any other substance, capable of acting on, and being impressed by spirit, in the same manner as iron is more susceptible of magnetism than any other substance: still, the correlative impressibility of spirit and matter being ascertained, all questions connected with it must be settled by means of observation and experiment, and not by our notions regarding its possibility.

There is but one other feature presented by mesmerism which we must notice, as somewhat important in its moral bearings; and that is the increased sensitiveness to spirit influence which mesmerised persons may gradually acquire: it conducts, therefore, in a direction which *may* lead to demoniacal intercourse. Already have we had indications of such a consummation having taken place in the persons of those unhappy individuals who give themselves out as *mediums*, in what is called "spirit-rapping." It seems exceedingly probable that, besides some constitutions being more predisposed than others to mesmeric sensibility, there are means, and certain kinds of training, to which the nervous system may be subjected, by which such a power may be acquired, and such connexions may be formed; but it would certainly not be for the benefit of mankind that such methods should be made public. The ground that ought to be taken by the philosopher and the Christian should be, not a determination to deny the facts, but an indignant condemnation of the whole system. They can afford to believe, upon sufficient evidence, anything that is affirmed to have taken place. Those persons who are called *mediums*, through whose instrumentality the familiar spirits are enabled to communicate with their devotees, are, on their own shewing, necromancers, sooth-

sayers, wizards, or witches, as the case may be; and although their revelations may be opposed to Christianity, science, or common sense, there is nothing wonderful or startling in all this, even though they should personate spirits now in heaven. It was much more wonderful that the "spirit of divination" should have directed the Philipians to Christianity as the true way of salvation, than that the demons of the present day should give more unequivocal evidence of their affinity to the father of lies.

CHAPTER XXIX.

THE SPIRIT AFTER DEATH—HADES AND GEHENNAH.

IN the previous chapters we have endeavoured to trace the natural history of the human species, or rather, we may say, the natural history of the sons of God; for there seems to be every reason to believe that man is only one of a large class of intelligent and moral beings scattered over the universe, whose constitution is everywhere the same, although their history may be widely different. We have ascertained that their constitution consists of a body, a soul, and a spirit; that the first state of each individual is the natural or psychical state, corresponding to the condition in which Adam was created, and continued to exist, up to the time of his Fall. We have found that this natural state provided for the propagation of the species, at least during the earlier period of existence, and also for its ultimate transition or development into the spiritual state, without the necessity of dying. This spiritual state we have found profusely illustrated, by the accounts given in Scripture of the spiritual bodies of what are called the angels of God, or the angels of heaven, as well as the resurrection body of our Saviour; and we have the glad assurance given to us in the Word of Promise, that the spiritual bodies of the resurrection saints shall be like that of their Saviour; so that, in the resurrection, they also shall be as the angels of God.

But in all this there was no provision made for such an event as the Fall; so that, when sin entered into the world, and death by sin, it was a calamity all the more frightful because of the immortality of the spirit. Death among the lower animals was a constitutional necessity, which, even in its most repulsive forms, was a relief rather than an infliction, because it extinguished all that ever existed either of consciousness or thought. To them, therefore, it was clothed in no terrors, and armed with no sting. But when death broke in among the sons of God, and wrecked their constitution by degrading it to a level with that of the beasts which perish, their immortal spirits shrunk from the dreadful thought that, when this earthly house of their tabernacle was dissolved, they would be cast out, naked and abject, from its ruins, into a state of houseless and hopeless destitution. The misery of a fallen spirit is an inevitable necessity, even though there were no hell and no judgment to come. The eternal wailing of a lost spirit, cast out into outer darkness, would be a worm that never died, even though there were no fire that never could be quenched.

The common belief that the souls of the wicked go down to hell after death, to remain there till the resurrection and the day of judgment, seems fully warranted by the parable of the rich man and Lazarus; and yet we must be careful lest, by too literal an interpretation, we infer more than the passage legitimately bears, more especially as the word hell in Scripture is used in a very different manner from that in which it is popularly understood.

We have already had occasion to remark, that in dealing with scientific truths, Scripture purposely makes use of the prophetic style, in which great facts are set forth under figurative representations. This corresponds

with the genius of the Shemitic mind, which is always inclined to dramatise its arguments and propositions in the guise of a parable, instead of announcing them under the form of an abstraction. While we admire, therefore, the wisdom and goodness of God in choosing His prophets from among the children of Shem, let us be careful not to fall into the error of attaching a Japhetic meaning to a Shemitic revelation.

In the Old Testament the word *sheol*, and in the New Testament the word *hades*, which are both translated hell, are names applied to a real or imaginary locality under the earth, where the souls of the departed were supposed to reside. We say an imaginary locality, because any attempt to fix upon the passages in which the word occurs more than a figurative meaning, would be committing the error which we have described as giving a Japhetic interpretation to Shemitic language. At all events, the *sheol* of the Hebrews is not the hell of our modern theology, but a world of spirits, or rather of souls (for the spirit is never spoken of as going down to *sheol*), and in this *sheol* both the righteous and the wicked are to be found. Its metaphoric character is evidenced by the scenes which are enacted in it: the kings of the earth are represented as sitting on their shadowy thrones, and rising in astonishment when the king of Babylon is ushered in among them. Abraham is represented as presiding at a feast of the redeemed, and the beggar Lazarus his most distinguished guest. At a distance, but separated by a great gulf, is the place of punishment, where the wicked are tormented in flames; and it is there that the rich man makes his appeal to Abraham, entreating that he would send Lazarus to dip the tip of his finger in water and cool his tongue. The parable is in-

tended to convey lessons of a far more important and practical character than the gratification of an incompetent curiosity, and it is so constructed as to forbid any attempt to extract from it any historical or scientific inference. Were we to attempt it, where should we find it possible to stop? not, surely, when we have affirmed that the soul at death descends to sheol or hades, in the lower parts of the earth; we must also infer that the blessedness of the righteous consists in feasting within sight of the fire that is never to be quenched, and that the misery of the wicked consists in being tormented in flames within sight of the blessed. We must affirm that, although the wicked cannot pass to the place of the righteous, nor the righteous to the place of the wicked, yet may they converse with each other, and know and observe who they are that are on either side of the gulf.

But hades is not the only word which is translated hell in the English Testament; there is another, or rather there are other two words, which have received the same translation, but which, it is very necessary to observe, have really a very different meaning. These are, *gehennah* and *tartarus*; and in order to bring out the meaning of the three words, it will be useful to quote the passages in which they respectively occur.

I. *Passages in the New Testament in which the word "HADES" occurs:—*

Matt. xi. 23. And thou, Capernaum, which art exalted unto heaven, shalt be brought down to *hades*. (See also Luke x. 15.)

Matt. xvi. 18. And I say also unto thee, That thou art Peter, and upon this rock I will build my church; and the gates of *hades* shall not prevail against it.

Luke xvi. 22, 23. And it came to pass, that the beggar died, and was carried by the angels into Abraham's bosom: the rich man also died, and was buried; and in *hades* he lift up his eyes, being in torments, and seeth Abraham afar off, and Lazarus in his bosom.

Acts ii. 24-27, 31. Whom God hath raised up, having loosed the pains of death: because it was not possible that he should be holden of it. For David speaketh concerning him, Therefore did my heart rejoice, and my tongue was glad; moreover also, my flesh shall rest in hope: because thou wilt not leave my soul in *hades*, neither wilt thou suffer thine Holy One to see corruption. . . . He, seeing this before, spake of the resurrection of Christ, that his soul was not left in *hades*, neither did his flesh see corruption.

Rev. i. 18. I am he that liveth, and was dead; and, behold, I am alive for evermore, Amen; and have the keys of *hades* and of death.

Rev. vi. 8. And I looked, and behold a pale horse; and his name that sat on him was Death, and *hades* followed with him. And power was given unto them.

Rev. xx. 13-15. And the sea gave up the dead which were in it; and death and *hades* delivered up the dead which were in them: and they were judged every man according to their works. And death and *hades* were cast into the lake of fire. This is the second death. And whosoever was not found written in the book of life was cast into the lake of fire.

II. *Passages in the New Testament in which the word "GEHENNAH" occurs:—*

Matt. v. 22. But whosoever shall say, Thou fool, shall be in danger of *gehennah* of fire (or fiery *gehennah*).

Matt. v. 29. For it is profitable for thee that one of thy members should perish, and not that thy whole body should be cast into *gehennah*. (See also ver. 30, and chap. xviii. 9, and Mark ix. 43, 45, 47.)

Matt. xxiii. 15. Ye compass sea and land to make one proselyte; and when he is made, ye make him twofold more the child of *gehennah* than yourselves.

Matt. xxiii. 33. Ye serpents, ye generation of vipers, how can ye escape the damnation of *gehennah*?

James iii. 6. So is the tongue among our members, that it defileth the whole body, and setteth on fire the course of nature; and it is set on fire of *gehennah*.

III. *A passage in the New Testament in which the word "TARTARUS" is used:—*

2 Pet. ii. 4. For if God spared not the angels that sinned, but cast them down to *tartarus*, and delivered them into chains of darkness, to be reserved unto judgment.

On these passages we may remark,—

1. That *hades* means not really a locality under the earth, but the disembodied state of the soul, after death, and before the resurrection.

2. We have no mention of the devils being in *hades*; the passage (Matt. xvi. 18) in which Christ affirms that the gates of *hades* should not prevail against his Church, or rather against Himself, whom he represents as the rock on which it is founded, evidently asserts the doctrine of His own and His people's future resurrection, as in Acts ii. 24. It is quite true that at the gates of a city, courts of justice were held, and proclamations made; but this was far from being the primary use of a gate; and, therefore,

when it is spoken of as prevailing or not prevailing against any one, the most obvious use must be referred to, and the meaning must be, that when the gates do not prevail, they are not sufficient to prevent a passage either out or in. If the gates of a city be spoken of, and they prevail against any one, that must mean to keep him *out*; or if the gates of a prison be spoken of, then when they prevail they are successful in keeping *in*. But hades is represented as a prison into which Christ descended in the character of a captive (Eph. iv. 8, 9), but His Father did not leave him there (Acts ii. 31), and indeed it was not possible that he could be holden there (Acts ii. 24). The gates of hades, therefore, did not prevail against him; and when His Father loosed the pains of death, He carried captivity captive, like Samson when the gates of Gaza did not prevail against him (Judges xvi. 3); and now, though death and hades are still a prison for the enemies of Christ, He holds the keys of both (Rev. i. 18).

3. Gehennah seems to indicate a place, or rather a state of torment, altogether distinct from hades. It does not refer to the state of the dead, but seems to indicate the punishment of the wicked *after* the second resurrection. "Fear him which is able to destroy both soul and *body* in gehennah" (Matt. x. 28). "And death and hades were cast into the lake of fire. This is the second death; even whosoever was not found written in the book of life was cast into the lake of fire" (Rev. xx. 13, 14).

4. From these passages, we cannot determine whether hades be a locality or not. *It may be, or it may not be*, for we have no positive evidence on either side. The *apparent* affirmation of locality is not sufficient: *First*, Because in the parable of the rich man and Lazarus, the description of hades is evidently metaphorical—the flame

—the drop of water—the finger of *Lazarus*—and the bosom of Abraham, are all figurative, and could not be descriptive of a real incident; *second*, because the *soul* is represented as going down to the heart of the earth, while the *spirit* is represented as going upward (Eccl. iii. 21), to God who gave it (Eccl. xii. 7); and *third*, because death and hades are associated in Revelation, and are both represented as being cast into the lake of fire.

It must be acknowledged, then, that we obtain very little information from these passages: all that we can possibly determine by their means is, that after death the spirit is disembodied—the righteous entering into a state of conscious happiness, the wicked into a state of conscious misery.

The change which takes place at the death of the righteous, is more distinctly indicated than the destiny of those who are lost; and the passages which refer to it, when viewed in the light of our previous investigations, conduct us to the threshold of a doctrine so sublime, that were it not corroborated by numberless allusions throughout the New Testament, we could not ourselves imagine it. To unbelievers the Scripture representations of the dignity and privileges of the saints, have always appeared presumptuous and absurd; and the saints themselves have always been slow of heart to receive the full testimony of the Bible regarding them; nor is it wonderful that it should be so—we are always inclined to measure God's intended dealings with us, by our own intended dealings with Him, so that when we catch the first glimpse of His condescending glory, the unbelieving pride of our heart starts up in the form of a spurious humility, and we

exclaim with Peter: "Thou shalt never wash my feet." And yet it was the desperate nature of our case that rendered it impossible to be remedied except by a great salvation: nothing but a personal union with God himself, through the incarnation of His Son, would have been sufficient for the purpose—an idea this, that never would have entered into the imagination of an angel; no wonder, then, that man, brutish man, should turn his dull, earthly gaze upon the doctrine, and read it wrong! "Oh how great is thy goodness, which thou hast laid up for them that fear thee!" sang David in one of his psalms (Ps. xxxi. 19); and Isaiah, enraptured, took up the theme, and replied, "Since the beginning of the world men have not heard, nor perceived by the ear, neither hath the eye seen, O God, beside thee, what he hath prepared for him that waiteth for him" (Isa. lxiv. 4); and Paul echoed back the sentiment, clothed in the brighter glory of the New Testament dispensation, saying (1 Cor. ii. 9, 10), "Eye hath not seen, nor ear heard, neither have entered into the heart of man, the things which God hath prepared for them that love him. But God hath revealed them unto us by his Spirit: for the Spirit searcheth all things, yea, the deep things of God."

We have already seen that the disembodied state of a spirit is not only an unnatural, but a desolate and unhappy state; so much so, that the spirit longs to be clothed upon with some tabernacle, either of earth or heaven. Such was the experience spoken of by the Lord in the parable: "When the unclean spirit is gone out of a man, he walketh through dry places, seeking rest, and findeth none. Then he saith, I will return into my house from whence I came out; and when he is come, he findeth it empty, swept, and garnished. Then goeth he,

and taketh with himself seven other spirits more wicked than himself, and they enter in and dwell there: and the last state of that man is worse than the first" (Matt. xii. 43-45). Such, also, was the experience of the thousands of demons that had taken up their abode in the demoniac of Gadara. They earnestly entreated our Lord (Luke viii. 31) that he would not cast them out into the deep, and suggested that even the bodies of swine would afford them a welcome covering, if they should be obliged to leave the man.

Nor is it otherwise with the saints of God, who, strictly speaking, never die (John xi. 26). Their spirits are never left naked. "For we know that if our earthly house of this tabernacle were dissolved, we have a building of God, an house not made with hands, eternal in the heavens. For in this we groan, earnestly desiring to be clothed upon with our house which is from heaven: if so be that being clothed we shall not be found naked. For we that are in this tabernacle do groan, being burdened: not for that we would be unclothed, but clothed upon, that mortality might be swallowed up of life. Now he that hath wrought us for the selfsame thing is God, who also hath given unto us the earnest of the Spirit. Therefore we are always confident, knowing that, whilst we are at home in the body, we are absent from the Lord: we are confident, I say, and willing rather to be absent from the body, and to be present with the Lord" (2 Cor. v. 1-8). From this we infer—

First, That at death the spirits of the saints are not unclothed, but clothed upon. Instead of a *tabernacle* of earth, they will then occupy a *house* from heaven.

Second, That this house from heaven is the glorious resurrection body of the Lord Jesus Christ, which re-

ceives the spirits of the saints until the day of the resurrection.

Third, That the change which then takes place is so glorious, that the saints are willing rather to be absent from their own body, and to be present with the Lord.

Fourth, That this sleeping in Jesus at death can only take place with those who have been converted to him during life: "He that hath wrought us for the selfsame thing is God."

Fifth, That at conversion a union is established between Christ and the Believer, in which the Holy Spirit enters and dwells in his body. This is called an "earnest" of the future, when the believer's spirit shall dwell in Christ. "What? know ye not that your body is the temple of the Holy Ghost which is in you, which ye have of God?" (1 Cor. vi. 19). "For we are members of his body, of his flesh, and of his bones" (Eph. v. 30).

We may notice that much of the force of the passage is lost in our translation. Were we to render the words *ἐνδημούντες* and *ἐκδημούντες* by the corresponding English, *in-dwelling* and *out-dwelling*, we might have a clearer view of Paul's train of thought. "Knowing that whilst we are in-dwelling in the body we are out-dwelling from the Lord: we are confident, I say, and willing rather to be out-dwelling out of the body, and to be in-dwelling with the Lord."

At the same time, we must be careful not to overstretch the analogy, as if our spirits held the same relation to the Lord's body that they do to our own, or the unclean spirits to the body of Legion. The body of Legion, which was tenanted by thousands of spirits, was a psychical body—the body of Christ is a spiritual body; and even the words of the text will not permit the idea of an exact

correspondence. The indwelling of the spirit is said to be *in* the body, and the outdwelling of the spirit is said to be *out of* the body; but as regards Christ, the indwelling is said to be *with* (*μετ*), not *in* (*ἐν*), Christ, and the outdwelling is said to be *from* (*ἀπὸ*), not *out of* (*ἐκ*), the Lord. (See also Rev. vi. 9.)

Still, the great fact remains, that the spiritual human body of Jesus becomes the residence of the spirits of the saints, when the earthly house of their tabernacle is dissolved at death; and if so, is not this an alarming consideration for those who are conscious that they have not yet received the earnest of the Spirit? That frail body of theirs, that little shallop in which they are embarked, must in a very short time go to pieces, and cast their trembling spirits out into the deep. No hell is needed to ensure their everlasting ruin; it is enough that God refuses to listen to their cry of woe. Often has the Holy Spirit pleaded to be taken in; often has He been despitefully refused; and when, at length, the frail vessel can hold out no longer, and the immortal spirit takes its first plunge into outer darkness, the shriek of that lost soul will find no echo of mercy returning from a rejected Saviour, but only the stern judgment of an avenging God: "Because I have called, and ye refused; I have stretched out my hand, and no man regarded; but ye have set at nought all my counsel, and would none of my reproof: I also will laugh at your calamity; I will mock when your fear cometh; when your fear cometh as desolation, and your destruction cometh as a whirlwind; when distress and anguish cometh upon you. Then shall they call upon me, but I will not answer; they shall seek me early, but they shall not find me" (Prov. i. 24-28).

The union between the saints and the Saviour is too

much regarded as a metaphorical, rather than a real and personal union. His Spirit really dwells in their bodies along with their spirits; and then, when that house of their tabernacle is dissolved, they have another and more glorious building, which receives them both. This was the grand purpose of the Saviour's work: "That they all may be one; as thou, Father, art in me, and I in thee, that they also may be one in us; . . . That they may be one, **EVEN AS WE ARE ONE**" (John xvii. 21, 22). There are three great mysteries revealed in Scripture: there is, first, the mystery of the Trinity—a *plurality of persons in one nature*; there is, next, the mystery of the Incarnation (1 Tim. iii. 16)—a *plurality of natures in one person*; and, lastly, there is the mystery of the Church in Christ (Eph. v. 32)—a *plurality of persons in one nature*. They are one, therefore, after the manner of the Trinity. .

CHAPTER XXX.

NATURAL HISTORY OF THE RESURRECTION.

WE have already had occasion to notice that light, heat, and electricity are convertible into one another, and that they are merely different forms of one force, which has not yet received a name, but which is as definite in quantity, and as indestructible in its substance, as matter itself.

We have also noticed that this force, when it ascends into organic life, acquires a new character and new properties; and, as all the changes which take place in inorganic matter are produced by this force in its inorganic forms, so are all the changes which take place in vegetables and animals produced by this same force in its organic forms. For example, when water boils in the boiler of a steam-engine the change is produced by heat, which is one of the inorganic forms of force, and part of the heat is converted into mechanical power, which is another of its inorganic forms. This mechanical force again may be made to drive an electrical machine, and then the mechanical power is converted into electricity, which is a third inorganic form of force; and thus the inorganic forms of force are converted into one another; and the changes which are taking place are produced, not by matter itself, but by force which enters it. In like manner, when light shines upon a living plant, the light,

which is one of the inorganic forms of force, is absorbed by the plant, and is changed into another form of force, different from any of its inorganic forms, and is capable of producing effects which neither light, heat, nor electricity, as such, is capable of producing; it has assumed an organic form, and is capable of producing organic changes. Thus, if there be water and carbonic acid present, this organic form of force can not only separate the oxygen from the water and the carbonic acid, but it can unite the carbon of the latter with the hydrogen of the former, and use up, at the same time, as much of the oxygen as is needed to form wood, or starch, or sugar, according to the necessities of the plant, or the part of the plant where it is in action.

It must also be remarked that the inorganic forms of force (for convenience we shall call them inorganic forces) cannot be changed into organic forces, except where there is already organic life. For example, light may be changed into organic force when it falls upon a living plant, and in this new form can produce wood or resin, or any other vegetable substance, wherever they may be needed, provided the materials are present from which they can be formed; but if light fall upon a piece of dead wood, or a piece of vegetable substance in which life is extinct, the light may be changed into some of the other inorganic forms of force, but it can never rise into any of the organic forms. Water and carbonic acid may be formed in any quantities, or they may be decomposed in any quantities; but wood, gum, or any vegetable substance can only be produced where there is already vegetable life.

But we must not confound organic force with organic life: organic force is capable of assuming only one form,

and performing only one function at a time. It may be used in combining carbon, hydrogen, and oxygen into one substance, and then it has the form of phyto-chemical affinity; or it may be employed in giving circulation to the sap within the cells, and then it assumes a phyto-dynamic form: but in whatever way it is used, it is capable of assuming only one form, and producing only one result at a time. It is otherwise with organic life, which produces not one but many different effects at the same time, according to the type or pattern to which it belongs; and these effects it produces, first, by converting the inorganic force into that kind of organic force which it requires for each part; and, secondly, determining the work that is to be done by it. In one place it is superintending the production of cells; in another, the storing of such cells with starch; and so on through all its establishment, like the general of an army, or the master of a workshop.

We now turn to the animal kingdom, and find the same principles at work. The blood conveys the nourishment to every part of the body, but it depends on the presence of life in each part whether it will produce any organic change or not. Wherever there is life, some organic force will be produced: at one place the blood will deposit skin, at another flesh, at another cartilage, and at another bone. In each of these parts there is the life power, but the kind and quality is different in each. The life power which determines the formation of bone, must be different from that which determines the formation of flesh; so that through the whole body there is as great a diversity of life power as there is diversity of material.

We must next observe that these exquisitely diversified life powers are not independent existences, but con-

nected and harmonious agencies, forming one grand and symmetrical whole, the counterpart and cause of the material body. The body without these is dead, and the organic forces—if it be permitted to speak of them as intelligent agents—even supposing them to act, would not know what to do; but while the anima, or soul, continues to energise the body, all its functions proceed in active harmony.

But let us look a little closer at this anima or soul, which so wonderfully gives direction to the organic forces. In every individual it has a type or pattern, according to which it works its labourers, and models its materials. The anima of a bird produces from the egg a bird: this is its type of working, from which it is incapable of deviating. The anima of a dog, on the other hand, produces a dog, and nothing else.

This, however, is not all; not only is there a *specific* type in each, there is also an *individual* type, according to which every individual has its own peculiar form. The materials of which a man is made, are constantly undergoing change. The hair, the nails, and the skin, the fluids, the flesh, and the bones, are all undergoing a process of continual renovation, constantly throwing off the old matter, and constantly receiving deposits of the new. The Falls of Niagara are not more changeful in their material than is the body of every living man. Every hour is producing a change in the materials of our bodies, although in some parts the change is more rapid than in others; and it may be truly said that every part of our body is but a slow cascade, receiving fresh matter in one place, and throwing off old matter in another; and yet, notwithstanding this continual change of material, the form remains always the same. Like the Falls of

Niagara, the matter changes, but the form and fashion in every particular continue unchanged. There is the same eye, the same nose, the same mouth, the same colour, the same height, and the same general form. What is it, then, that constitutes the identity of the individual? Is it the visible matter that is without? No! it is the unseen psyche or soul within.

To illustrate the bearing of these truths on the doctrine of the resurrection, we shall consider the case of a man who, either by disease or famine, is reduced to a mere skeleton,—his eyes are sunk, his cheeks hollow, and his bones protrude from underneath the skin. We shall first suppose that this man recovers his former health; and that by careful nursing for a few months, his strength and fulness return, so that those who now look on his bright eye and powerful frame, would not suppose that he had ever been sick. The question naturally presents itself, Is this man's body which we now see the same as the body he had before he became ill? When he was in his lowest state of emaciation his friends would not have known him; and had he been weighed, it would have been found that he had lost several pounds in weight. Now, he is as heavy as he was before, and we perceive no change in his appearance, notwithstanding all he has come through. In one sense it is the same body as before, but in another it is not the same. There is the same appearance, the same form, the same colour, the same peculiarity of features; but as regards the materials, they are not the same; besides the regular change that is always taking place in the body, there are all the fresh materials which have been added during recovery. If even the bones, the flesh, and the liquids, which remained at the time of emaciation, have been continually changing, so that not

even they are the same, when we take into account the increase in weight which has taken place, and which is attributable, of course, to the nourishment which he has received, we are forced to the conclusion, that the materials of his body are not, to any great extent, the same. Nothing can be more certain than that the flesh which was lost in disease is gone for ever, and the flesh that now is has been acquired from the food received during his recovery.

But we shall next suppose that the man does not recover; he dies, and his emaciated body is laid in the grave—the dust returning to its kindred dust. Another question suggests itself, When this man rises at the resurrection, with what body shall he come? If in the resurrection morn he arises, not as when he died, spent and emaciated, but as when he was in health, strong and robust, what are the materials of which his body is composed? If it be asserted that the body which rises at the resurrection is the same as that which is laid in the grave, or rather that which was in health before the sickness of which he died, then it does seem strange that the materials which were wasted from his body before he died, should be available for the resurrection, and yet they would not be available for his recovery; in other words, that the flesh which he lost in sickness, would be really lost if the man recovered, but if he died it would not be lost, but, on the contrary, though it were carried by the four winds of heaven, and dispersed over all the earth, every particle would be watched over by a superintending Providence, and at the resurrection reunited, so as to make up the healthy body, of which it once formed a part.

When viewed in this light, it is evident that the real

identity of our bodies does not depend so much upon the identity of the materials of which they are composed, as the identity of the soul or psyche, which gives them their form. If we acknowledge this principle in health and in sickness, why should we not acknowledge it also in regard to the resurrection? Let us revert, for illustration, to our old idea of a cataract, in which the waters are continually changing, though the cataract itself remains unchanged; and we shall suppose that by some great convulsion of nature, the waters of the St Lawrence, instead of pouring down over Niagara, should find an outlet to the ocean by some other channel,—the rocky shelf, over which they were wont to leap, would be left bare and dry, and the great Niagara would be dead. But let us next suppose, that, by another convulsion of nature, the waters of the St Lawrence return to their former channel, after an interval, say, of a thousand years,—the rocky precipices over which they once plunged is the very same as it was before—every projecting rock, every torn gulley, is still there; and when at length the waters reach the edge, and again commence their song of thunder, every minute feature that the traveller used to mark in the living landscape would reappear, and the great Niagara would be alive again—the very same Niagara that it was before.

CHAPTER XXXI.

SCRIPTURE DOCTRINE OF THE RESURRECTION.

WE now turn to Scripture to learn what the resurrection from the dead should mean, aided by the light that modern science is able to reflect upon it; and, in the first place, we must remark that Scripture, when studied attentively, presents the doctrine of the resurrection somewhat differently from the manner in which it is at present popularly understood.

The doctrine, as presented in Scripture, is of magnificent importance, involving all our hopes of future glory; whereas, in modern times, it is viewed merely as an interesting fact, that the body is ultimately to share the blessedness enjoyed by the spirit after death. The general impression is, that the spirit after death is admitted into heaven, and immediately experiences a joy unspeakable and full of glory, one hour of which would be sufficient to compensate for all the sorrows of our pilgrimage on earth. For this reason, the question of a future resurrection of the body is viewed as of comparatively little importance; for although it is acknowledged that the blessedness of the saints will not be complete until that event takes place, it is scarcely ever felt as if the want of it would be a matter greatly to be deplored. Hear, then, what Paul says (1 Cor. xv. 29-32), "If the dead rise not

at all, why are they then baptized for the dead? And why stand we in jeopardy every hour? I protest by your rejoicing which I have in Christ Jesus our Lord, I die daily. If after the manner of men I have fought with beasts at Ephesus, what advantageth it me, if the dead rise not? let us eat and drink; for to-morrow we die." This discrepancy may be accounted for by the different ways in which the doctrine is regarded. Christ and His apostles, with the consent of the Pharisees and Sadducees, regarded the doctrine of the resurrection as involving the entire question of a future state. If there be a resurrection, there is a future state; but if there be no resurrection, there is no future state. Whatever may be the cause, it is quite evident that no difficulty was felt on either side in regard to the possibility of the rising of the body. The Sadducees never raised the question; and when our Lord silenced them by His celebrated argument, He never even alluded to it. He quoted the words of Jehovah: "I am the God of Abraham, and the God of Isaac, and the God of Jacob;" and He adds, "God is not the God of the dead but of the living." This answer, it is said, "put the Sadducees to silence," shewing that they felt that, when the doctrine of a future state was proved, the resurrection of the body was necessarily involved. The New Jerusalemites—who deny the resurrection, or rather who assert that the resurrection is nothing more than the rising of the spirit from the body when it dies—argue, with apparent plausibility, that as our Lord does not assert anything more than the fact, that Abraham, Isaac, and Jacob are still living, and makes no illusion to any future resurrection, He does not assert the resurrection of the body at all. This evidently cannot be the true explanation, because the resurrection of our Lord (which is over and

over again identified with our resurrection) did not take place when His spirit left the body, but on the third day, when His body came out of the sepulchre alive. The true explanation is to be found in the necessity of the spirit being lodged in a body in order to enjoy existence, and the utter insufficiency of a future state without a resurrection. It is quite true that our Lord's argument was principally directed to the proof of the spirit's existence after death, a doctrine which the Sadducees denied; but it proved more than that, for if God was not ashamed to call Himself their God, He became pledged to their resurrection. The doctrine held by the pious Jews was this, that although life was forfeited by sin, and the spirit was deprived of its tabernacle, yet the spirits of the just were not destroyed at death, but returned to God to await the resurrection. This resurrection, which was to evidence the pardon of their sin, and to restore to them the full enjoyment of their existence, was to be accomplished by the promised Messiah, who was, for this reason, the Hope of Israel (Acts xxvi. 6, iii. 21). Had our modern notions of the disembodied state been the doctrine held by the Jews, and defended by Christ, his argument would have been altogether aside from the question! If justification from sin and restoration to God's favour could have been enjoyed in a permanently disembodied state, the Sadducees might have admitted all that our Lord asserted, and yet have denied the resurrection; but when forced to admit that Abraham, Isaac, and Jacob were not only still in existence, but justified from their sins and received into God's favour, the doctrine of the resurrection followed without any further argument.

It is interesting to observe how anxiously Paul pleads for the resurrection on these grounds. Without a resur-

rection there could be no justification: "If Christ be not raised, your faith is vain; ye are yet in your sins" (1 Cor. xv. 17). He regarded the resurrection of Christ as the very citadel of the gospel, and if that was lost, all was lost: "They also which are fallen asleep in Christ are perished" (ver. 18). When the earthly house of their tabernacle is dissolved, there would be no house of God to receive their naked spirits.

But it may be asked, If the spirits of believers are received by Christ at death, what greater happiness could they enjoy? We answer, that the happiness which believers enjoy in Christ, besides being merely of a passive and sabbatic character, is imperfect in its kind, although it is perfect in degree. The human being consists of body, soul, and spirit; and so long as any of these is wanting, he is an imperfect creature, and unable to fulfil or enjoy the full end and design of his creation. The lodging of the spirit in the person of Christ, although it provides enjoyment and repose, is not of such a kind as to produce individual action, such as would result from its being normally united to a body of its own. For this reason we cannot but notice that the spirits of the saints, although delightfully conscious of their union with Him, are represented as being "asleep in Jesus," and entering "into rest" (1 Cor. xv. 6, 18, 51; 1 Thess. iv. 13, 14, 15; Heb. iv. 11; 2 Peter iii. 4; Rev. vi. 11; Rev. xiv. 13). When viewed in this light we see that the resurrection occupied a much more important place in the hopes of the Church during the apostolic age than it does now.

Another remark, which we must make in regard to the popular ideas of the resurrection, is this. The Scriptures, in speaking of the resurrection, refer more to the persons than to the bodies of believers as the subjects of the resur-

rection; whereas we generally refer more to the bodies than the persons. It is unfortunate that our English word resurrection contains the idea of rising *again*. This idea is not contained in the Greek substantive *ἀνάστασις*, nor the verb *ἐγείρω*. It is true that the prefix *ἀν* often means "again," but in this word *ἀνάστασις* it means "a raising up." The word *ἐγείρω*, which also occurs frequently in this connexion, has very much the same meaning—"to raise up," and cannot mean to raise *again*. Some may, perhaps, think that this is an unimportant criticism, because, if the dead be raised up, it is of little importance whether we add the word "again" or not; for it is implied under the circumstances. But the criticism is somewhat important; because if we understand, in connexion with our preceding remarks, that it is the person rather than the body that is raised up, we may say that the dead rise up, without attaching much importance to the idea of their bodies rising *again*, as if it were necessary that the same bodies should rise that had been laid down.

The question—"With what bodies do they come?" appears to have been agitated also in apostolic times, and was answered by Paul in his First Epistle to the Corinthians (chap. xv. 35): "But some man will say, How are the dead raised, and with what bodies do they come? Thou fool, that which thou sowest is not quickened, except it die: and that which thou sowest, thou sowest not that body which shall be, but bare grain, it may chance of wheat, or some other grain." Here the question is answered so plainly, that it is strange that it should ever be repeated. "That which thou sowest, thou sowest not that body which shall be." The body, therefore, with which the dead rise, is not necessarily any more the body that was laid in the grave than is the stalk of wheat which

is ripened in autumn the same as the grain of wheat from which it germinated in spring.

This is the chief portion of the reply, but it is not the whole: it answers only the second question, With what body do they come? The first question, How are the dead raised? is of a more general character, and invites an illustration taken from some process in nature, which, although it might not explain the doctrine, would at least help to illustrate it. This St Paul proceeds to do, by means of the figure of the seed, which in several particulars presents appropriate analogies.

In the first place, the seed is a part of the plant which is generated *in the plant*; and which, when it has arrived at maturity, is capable of being separated *from the plant* without losing its vitality.

In the second place, it contains within itself all the characteristic qualities of the plant on which it grew, and is capable of producing another plant of the same kind whenever it shall be placed in circumstances favourable to its growth. And,

In the third place, germination cannot take place until the seed has been shed from the parent stalk, and buried in the ground.

It is in these three particulars that the germination of a seed is emblematic of the resurrection, and the question arises, What is it that the seed represents? The plant that springs from the seed is evidently the representative of the resurrection body; but what is it that forms, as it were, the seed from which it springs? When viewed in the light of our previous studies, and compared with its corresponding passage (John xii. 24), the seed, or "bare grain," represents the person who dies. Thus, Jesus speaks of Himself when He says, "Verily, verily, I say

unto you, Except a corn of wheat fall into the ground and die, it abideth alone: but if it die, it bringeth forth much fruit." It is true, that this is an entirely different application of the figure from that which is made by Paul, yet the subject is essentially the same. It might be objected, that if the seed really died, it would not germinate; but this is evidently refining too much. Modern science has shewed that the seed consists of two parts, one of which dies in order to become nourishment to the other. The little germ that exists in every seed swells with the moisture of the ground in which it is sown, and the perisperm, or cotyledon, which surrounds it, is simply a storehouse of nourishment to enable it to grow, until it has sent its root downwards and its plumule upwards, to draw its support from the soil and the atmosphere. The perisperm must die in order to accomplish this; because, until it has been reduced to a soluble, and then a liquid state, it cannot pass into the tissues of the plant. The seed, therefore, does die in one of its parts, though not in the other, and for that very reason is an accurate representative of mortal man. His spirit, like the germ, does not die; but the body, like the perisperm, does die before the spirit assumes its germinating powers, in order to produce the spiritual body. In the case of our Lord's body, as well as those who are alive and remain at His coming, the mortal body, like the perisperm, supplies the materials out of which the spirit has to elaborate its glorious tenement; but, in the case of all the others, the mere convenience of having the materials at hand will not be important; and the dust which is scattered to the winds need not be gathered again, because the identity of the future body is not dependent upon it.

The remaining verses of this wonderful passage, down

to the 50th, are devoted to the illustration of the difference between the natural and the spiritual body. Ver. 38, "But God giveth it a body as it hath pleased him, and to every seed his own body." In this verse we are to notice,—

1. That, while the changes that take place in the seed are produced by the operation of the natural laws, he ascribes both the laws and the changes to the will and the hand of God. This invites our attention to the same principle as applicable also to the resurrection. The dead are raised up by the power of God; but He works by means and according to law. And,

2. Every seed produces its own body—that is to say, there is a correspondence between the nature of the seed and the nature of the plant that rises from it, not only in regard to the species, but also in regard to the individual. Not only will the resurrection body be a human body, it will also be *our* body—not perhaps composed of the same materials, but it will be a true continuation of our own body—the continuity depending on the identity of soul and spirit in both.

In the 39th verse, the apostle illustrates this principle a little more in detail—"All flesh is not the same flesh: but there is one flesh of men, another flesh of beasts, and another of birds." The idea contained here is still an appeal to the operation of natural laws, but for a different purpose. Every seed produced its own body, but there are different kinds of seeds. From man is produced man, from beasts are produced beasts, and from birds are produced birds; and it altogether depends on what the seed is, what the result will be. The apostle has in view the grand conclusion to which he is drawing the reader in the 49th verse, where he asserts the great

doctrine that the body which shall rise will be a spiritual body, whereas the body that is sown is a natural one. In the case of wheat, the plant and the seed are alike; in the case of the believer, there is a change, and it is to account for that change, that he proceeds in his argument.

Ver. 40. "There are also celestial bodies, and bodies terrestrial: but the glory of the celestial is one, and the glory of the terrestrial is another." The English reader is very apt to misunderstand this verse, as if it were more intimately connected with the succeeding verse than it really is. "Celestial bodies" (*σώματα ἐπουράνια*) do not mean such bodies as the sun, moon, and stars, for the Greek word is never used in such a sense. What is meant is, the bodies of heavenly persons; and the glory that belongs to them is here said to be different from the glory that belongs to the "bodies that are on earth." The apostle is still drawing nearer to his conclusion, because the difference between the bodies of men and the bodies of beasts was not so appropriate an illustration of the change, as the difference between the bodies of men and the bodies of angels. It is not so much a difference of structure as a difference of glory.

Ver. 41. "There is one glory of the sun, and another glory of the moon, and another glory of the stars: for star differeth from star in glory." Here the idea of the previous verse is followed up and enlarged. Not only does the resurrection body differ from the natural body in its kind of glory, there will also be a difference in the amount of glory in the resurrection saints.

The verses that follow are merely an application of the argument; but it ceases to be merely argumentative, for the apostle appears to have caught fire from his theme, and his exulting spirit expatiates upon the glory that is

to follow, and towards which his soul was seeking. He says, "So also in the resurrection of the dead; it is sown in corruption, it is raised in incorruption: it is sown in dishonour, it is raised in glory: it is sown in weakness, it is raised in power: it is sown a natural body, it is raised a spiritual body." This last contrast, which expresses what might be called the scientific distinction between the two bodies, introduces another, and altogether different view of his subject, and it is one for which he had been gradually preparing his readers. "There is a natural body, and there is a spiritual body;" that is to say,—Whatever might have been the fate of Adam and his children, and whether a resurrection had been provided for them or not; even, indeed, though Adam had not existed at all,—as there is a flesh of beasts and a flesh of birds, so there is a natural body and there is a spiritual body; and it is to these very classes that we do now, and shall hereafter belong. We have at present a natural body, and one allied, on that account, to the lower animals; but at the resurrection we shall have spiritual bodies, glorious and incorruptible, like those of the holy angels.

We have already remarked, in a previous chapter, that our translation of this passage fails to exhibit the correspondence between the 44th and 45th verses. The word "natural" in the 44th verse, and the word "soul" in the 45th, would never suggest to the English reader, that in Greek these two words are radically the same: yet so it is. "There is a *psychical* (or *soul*) body, and there is a *spiritual* body: and so it is written, The first Adam was made a living *psyche* (or *soul*), the last Adam was made a quickening *spirit*." What, then, is meant by a "*psychical* body?" In the first place, it is evident that being an adjective, formed from the substantive *psyche*, it may be

most literally, though not very elegantly, translated a "*soul body*," as distinguished from a "*spirit body*;" and a little further light may be thrown upon it by examining the only other passages of the New Testament in which the word occurs, viz., 1 Cor. ii. 14; James iii. 15; Jude 19. In one of these it is translated as it is here, by the word "natural;" but in the other two it is translated by the word "sensual." There is another English word, "animal," derived from the Latin *anima* (the soul), which expresses, with considerable accuracy, the meaning of the Greek word *ψυχὸς*; and if we unite these two translations, we shall have a very valuable key to the meaning of all these passages; thus—

There is a *sensual or animal* body, and there is a spiritual body (1 Cor. xv. 44).

The *sensual or animal* man receiveth not the things of the Spirit of God (1 Cor. ii. 14).

This wisdom descendeth not from above, but is earthly, *sensual or animal*, devilish (James iii. 15).

These be they who separate themselves, *sensual or animal*, having not the Spirit (Jude 19).

We might also shew very clearly the connexion between the 44th and the 45th verses, by translating both words as animal:—44. "There is an animal body, and there is a spiritual body. 45. And so it is written, The first Adam was made a living animal, the last Adam was made a life-giving spirit. 46. Howbeit that was not first which is spiritual, but that which is animal; and afterwards that which is spiritual."

The contrast which is here so much insisted on between the soul and the spirit, as characteristic of the two natures which are respectively animal and angelic, directs our attention necessarily to the difference between the soul

and the spirit in the human person, and a hasty judgment would, perhaps, lead us to suppose that at the resurrection the soul will be wanting, inasmuch as the "sensual" will disappear. This, however, will not bear a closer examination. The body, the soul, and the spirit, will still be there, but the spirit will predominate over the soul. That the soul will still be present in the resurrection body is rendered exceedingly probable, *first*, from such passages as these, "His soul was not left in hell, neither his flesh did see corruption" (Acts ii. 31); "Fear not them which kill the body, but are not able to kill the soul; but rather fear him which is able to destroy both soul and body in hell" (Matt. x. 28): and, *second*, from the circumstance that the spiritual body, being able to receive into its stomach such substances as these, "broiled fish, and honey-comb" (Luke xxiv. 42), milk, butter, veal (Gen. xviii. 8), and unleavened bread (Gen. xix. 3), must have a ganglionic system; and if it has a ganglionic system, it must also have a soul to energise it. We might even draw an argument from the statement regarding the two Adams, the first was a living soul, the last a quickening spirit; but inasmuch as the first Adam, though the soul predominated, had also a spirit; so, the second Adam, though the spirit predominated, may also have a soul.

This introduction of Adam and Christ in their covenant relations, brings up the last element of the theory of the resurrection. In the case of the angels who never sinned and never died, the animal body naturally transformed itself into a spiritual body, which, according to the constitution of the angelic nature, was its last and most perfect development. But when Adam fell, his animal body lost its power of development into the spiritual; and it

became necessary that an external power should interfere, to restore the constitution to what it originally was. The last Adam was not only a living spirit, he was a life-giving spirit ; and it is by the power communicated by him that the resurrection takes place. " He that raised up the Lord Jesus, shall raise up us also by Jesus" (2 Cor. iv. 14).

CHAPTER XXXII.

THE RESURRECTION OF CHRIST.

As the resurrection of Christ holds an important relation to the resurrection of His people, it is necessary that we should study it by itself, to discover wherein it differs and in how far it is the same.

Notwithstanding the frequent allusions by the apostles to the resurrection of Christ as the type and first-fruits of His people's resurrection, there are some important particulars in which they differ. For example, the resurrection of Christ was like no other resurrection, because it had to be accomplished by different means and in a different manner. We rise because Christ rose, but Christ rose by His own Divine power. His death was not like that of any of His people, because He had no Saviour; and His resurrection also was unlike theirs, because there was no one who had gone before to open the prison gates and take possession of the keys of hell and of death. He had to encounter these enemies alone and in His own strength: "Of the people there was none with Him." It is not so with the saints; they have been able, in all ages, to face death in its most appalling forms, not only without fear, but with triumphant exultation; and when they rise from the dead, it is by Him that they rise (1 Cor. xv. 21, 22), for He is the resurrection and the life (John xi. 25), and He will raise them up at the last day (John vi. 39, 40, 44).

Another particular in which the resurrection of Christ is not like that of His people, consists in the marks of His wounds being preserved in His resurrection body. The prints of the nails in His hands and feet, and the wound made by the spear in His side, were not closed when He appeared to His disciples, so that He could say to Thomas, "Reach hither thy finger, and behold my hands, and reach hither thy hand, and thrust it into my side; and be not faithless, but believing" (John xx. 27). The intention probably was that He might the more effectually convince them of His identity,—“Behold my hands and my feet, that it is I myself” (Luke xxiv. 39); and probably also for this reason He was to be slain by the Romans and not the Jews—crucified and not stoned—for “a bone of Him was not to be broken.” Had His death been like that of many of His martyrs, had He been beheaded or sawn asunder, the manner of His resurrection could not have been the same. In this respect the resurrection of Christ must differ from that of all His people, because whatever be the nature of their death, and even whatever may have been their privations in life, the blind and the deaf, the maimed and the deformed, must all be perfect in heaven.

A third difference between the resurrection of Christ and that of His people consists in His flesh not seeing corruption. In the case of the latter-day saints, it is true their bodies also shall not see corruption; but in regard to all others, their bodies shall be entirely dissolved. For these and other reasons, we are not to suppose that because the materials of the mortal bodies of Christ and the latter-day saints went to supply the materials of their spiritual bodies, therefore the same must be the case with all His people. The result is the same in all; but the

means and manner of the change are necessarily different.

Let us examine, then, the records of Christ's resurrection, in order to study its details. That Christ really died, there cannot, of course, be any doubt. His spirit He commended to His Father in Paradise, and there He met that day the repentant malefactor who was crucified along with Him. His soul He made an offering for sin, and, in the figurative language of Scripture, descended into hell, and was three days and three nights in the lower parts of the earth. The body, then, was deprived both of soul and spirit—the Godhead alone remained in connexion with it; for we must not forget that the Godhead was united not less to the human body of our Lord, than to His human soul and spirit. The Second Person of the Trinity was still united to the body, and therefore it could not see corruption. It is commonly understood that our Lord was only two days and two nights under the power of the grave; being crucified (as it were) on Friday, and rising from the dead early on Sabbath morning—in all forty-two hours. A more careful examination of Scripture, however, will shew that this is a mistake, and that our Lord was crucified on Thursday, and that He was, therefore, three days and three nights in the sepulchre—in all sixty-six hours. The error is evidently a Roman error, and has arisen from a substitution of Roman in the place of Jewish time. The Romans counted their days from midnight to midnight—the Jews counted their days from sunset to sunset, or rather from evening to evening. Their Sabbath began on Friday evening at sunset, and it ended on Saturday evening at sunset; so that every evening, as it came, ushered in a new day. For this reason, the expression, “when the

evening was come," or, "when the sun was set," was as much as to say that one day was past, and that another day was begun. If the day that was come was a Sabbath, then, when the evening was come, all labour must cease; or if the day which had just closed had been a Sabbath, then, when it is said that the evening was come, or when the sun was set, labour might again be resumed; and that which would have been a crime before the sun was set, might now be a duty (Mark i. 32). From evening to evening (says God) shall ye celebrate your Sabbaths (Lev. xxiii. 32).

This, then, appears to be the origin of the mistake; all other passages would represent the crucifixion as having taken place on Thursday, except one, which, when read in a Roman sense, expressly asserted that it took place on the day before the Sabbath. This passage is in Mark xv. 42, where it is said, "And now, when the even was come, (because it was the preparation, that is, the day before the Sabbath,) Joseph of Arimathea, an honourable counsellor, who also waited for the kingdom of God, came, and went in boldly unto Pilate, and craved the body of Jesus." The Roman reader would never doubt that, if the *evening* of the crucifixion was the day before the Sabbath, the *day* of the crucifixion must have been the same; and, accordingly, a difficulty arose, how to make this harmonise with all the other passages, which, though they might not speak so precisely, yet certainly seemed to say that our Lord was more than two days and two nights in the sepulchre. The Jewish reader, on the other hand, would never fall into this mistake; and, therefore, the institution of what is called Good Friday could not have taken place during the time of the apostles.*

* See Appendix I.

What, then, took place during those three days and three nights in which the Son of man was "in the heart of the earth?" Had there been no miraculous preservation of the body by the power of God, in ordinary circumstances the absence of life for sixty-six hours would have been sufficient to produce putrefaction; but we are told that His body did not see corruption. Was it because the power of God was producing a gradual change from the corruptible to the incorruptible—from the psychical to the spiritual state. It may have been so; for, although it is said that His soul descended to the lower parts of the earth (Eph. iv. 9), and continued there all the time (Matt. xii. 40), still this language does not necessarily exclude the other idea, because we find the Psalmist apply the same figure to the process of organisation going on in the womb before birth—"My substance was not hid from thee, when I was made in secret, and curiously wrought in the lower parts of the earth."

We are informed that, upon the day of the crucifixion, "the earth did quake, and the rocks rent; and the sepulchres were opened; and many bodies of saints which slept arose, and came out of the graves after his resurrection, and went into the holy city, and appeared unto many" (Matt. xxvii. 51-53). We must not confound this kind of resurrection with such events as the raising of Jairus' daughter, or the widow of Nain's son, or even Lazarus; for, although the dead heard the voice of the Son of man and came forth alive, it was a mere recovery from death, as it were, in their case, without the body being changed—Lazarus and the other two rose as they died, with corruptible bodies, and would die again; whereas those who were in the sepulchres (whose doors had been broken by the earthquake), and who awoke and came out of them

after Christ's resurrection, rose from the dead, not with psychical, but with spiritual and glorious bodies, never to die again. They did, indeed, appear to many, but they did not return to their former friends and homes, just as Jesus, after His resurrection, appeared to many, but He never dwelt on the earth again.

In this case it is interesting to observe, that although the sepulchres were opened on the day of the crucifixion, at the time when Jesus died, yet they did not rise from the dead till after Jesus rose. This was necessary, not only because Jesus must be the first-fruits from the dead (1 Cor. xv. 20), but chiefly because they could not be raised, but through Christ. He was raised from the dead directly by the power of God; they and we must be raised not only by the same power that raised up Christ, but it must also be *by Him* that this power must work (2 Cor. iv. 14; 1 Cor. xv. 22). The question again presents itself, What was the history of these bodies during the three days and three nights that intervened between the opening of the graves and their coming forth alive? This question we cannot as yet answer: perhaps, when the whole subject has been studied aright, this, with many other things that are yet dark, may be made to appear very plain.

We are informed that these saints came out of their graves after Christ's resurrection, and merely appeared unto many. How long they continued we are not informed; but as there is no reason to believe that they are still on earth, we may suppose that they appeared on various occasions during the forty days that preceded Christ's ascension; and, although they were not seen by the disciples on the Mount of Olives, it is most likely that they accompanied our Lord in his triumphal ascent into heaven.

CHAPTER XXXIII.

THE SECOND COMING OF CHRIST.

BEFORE attempting a harmonised view of the predictions concerning the second coming of Christ, it is almost necessary, in dealing with such a subject, to decide what place science shall occupy in the attempt; especially how far it may be permitted to modify or supplement the statements of Scripture, as statements of future history. Conceding at once that the statements of Scripture, on this and all similar topics, are subject to the inquiry, whether they are to receive a literal, or a metaphorical, or apocalyptic interpretation; conceding also, that, from the very nature of the subject and style of several of the passages, there is much that is metaphorical, and much that is apocalyptic; still the great leading facts are too distinctly asserted to permit any doubt to exist as to their reality. It is evident that, in examining those statements which are to be literally interpreted, science is not only permitted but invited to speak in explanation; but it is most necessary to bear in mind that science is a progressive teacher, and that any scientific explanation which should profess to afford a complete solution of all the facts, would carry with it, on that account, a very strong suspicion of its inaccuracy. For this reason it is safest still to lean toward the literal, and to consider those incidents which the present state of science cannot explain as miraculous

—not that they are really so, but to us, in the meantime, they are as if they were miraculous; and it is far better to do this, waiting patiently till advancing science shall provide the solution, than to explain them away, or cast suspicion on their reality, merely to suit the anxious guesses of an immature philosophy. No doubt, this implies that a corresponding modesty is to be observed by the biblical critic, knowing, as he ought to know, that even the science of criticism is not yet perfect, and that, in the united efforts of both kinds of inquiry, the subject is too high, and the light too dim, to warrant any great amount of confidence in regard to any of their conclusions.

We will now transcribe those passages which appear to contain statements regarding the second coming of Christ which are to be understood literally, and then we will endeavour to produce a harmony, in which each statement would find its appropriate place.

Acts i. 11. This same Jesus, which is taken up from you into heaven, shall so come in like manner as ye have seen him go into heaven.

Matt. xxv. 31. When the Son of man shall come in his glory, and all the holy angels with him, then shall he sit upon the throne of his glory.

Mark viii. 38. When the Son of man cometh in the glory of his Father, with the holy angels.

2 Thess. i. 7. The Lord Jesus shall be revealed from heaven with his mighty angels.

Jude 14. The Lord cometh with ten thousand of his saints.

Acts iii. 20, 21. He shall send Jesus Christ, whom the heavens must receive until the times of restitution of all things.

Matt. xvi. 27. The Son of man shall come in the glory of his Father, with his angels.

Matt. xxiv. 30, 31. They shall see the Son of man coming in the clouds of heaven with power and great glory. And he shall send his angels with a great sound of a trumpet [or with a great trumpet call], and they shall gather together his elect from the four winds, from one end of heaven to the other.

1 Thess. iv. 14-17. For if we believe that Jesus died, and rose again, even so them also which sleep in Jesus will God bring with him. For this we say unto you by the word of the Lord, that we which are alive and remain unto the coming of the Lord, shall not prevent them which are asleep. For the Lord himself shall descend from heaven with a shout, with the voice of the archangel, and with the trump of God: and the dead in Christ shall rise first: then we which are alive and remain shall be caught up together with them in the clouds, to meet the Lord in the air: and so shall we ever be with the Lord.

1 Cor. xv. 51, 52, 53. Behold, I shew you a mystery; We shall not all sleep, but we shall all be changed, in a moment, in the twinkling of an eye, at the last trump, (for the trumpet shall sound;) and the dead shall be raised incorruptible, and we shall be changed. For this corruptible must put on incorruption, and this mortal must put on immortality.

From these passages we are to understand that the second coming of Christ, while it will be a real and personal descent from heaven (as real and as personal as was his ascent to heaven from the Mount of Olives), will be a far more glorious and more public event than any which this world has ever seen—uniting the grandeur of the

thunders of Sinai with the more personal and yet world-wide interest of the days of Noe.

We are also assured that, at His coming, He will be accompanied by His mighty angels, and myriads of His saints. The angels will be seen and heard, but the saints who come with Him shall not be seen; because, with the exception of Enoch and Elijah, and those who came out of their graves at the resurrection, the saints who sleep in Jesus, and whom He must therefore bring with Him, must come in their disembodied state, to receive from the earth spiritual bodies, fashioned like unto His glorious body. This explains the apparent contradiction of the two statements: "Them also that sleep in Jesus will God bring with Him," and "The dead in Christ shall rise first." The spirits of the saints are at present in heaven; for, being united to Christ, "where He is, there must they be also,"—they "sleep in Jesus." When He comes, therefore, He will bring their spirits with them: "Ye are dead," says Paul to the Colossians (iii. 3), "and your life is hid with Christ in God. When Christ, who is our life, shall appear, then shall ye also appear with Him in glory." When He is come, therefore, or rather while He is yet a coming, but not yet arrived, the spirits of the saints will descend to earth; and at the sound of the trumpet will enter the spiritual bodies prepared for them, and rise from the dead incorruptible and full of glory.

Surely, in sight of such a prospect it is an unimportant question, whether or not that glorious body will be built up of the very same atoms of carbon, hydrogen, oxygen, phosphorus, and lime, which happen to be present in the body of death, and which, were we to live a little longer, would all in turn be set free to perform other duties, and perhaps contribute to the formation of other bodies.

Would it really constitute a greater identity if these same atoms should be brought together again, than if others exactly the same should be used? In the case of millions, we know that their bodies have been reduced to atoms, and if all the atoms of each element be alike, the kind of identity we are striving after is but a dream. It is not the substance, it is the form and structure, and their correspondence with our souls and spirits, that will constitute the identity of our bodies. If the marble statue of the Apollo Belvidere were ground to powder after a mould had been taken from it, and the marble dust used for common lime; the restoration of that great work of art would not depend on the same marble being used, but on the perfection with which every feature would be reproduced.*

If, notwithstanding these considerations, the believer is still disposed to the idea, that the materials of the mortal body will be again used up in the construction of the resurrection body, his opinion is certainly entitled to respect, for there is nothing in Scripture which forbids such an idea; all that is required of him is, that he should be equally tolerant of those who, in the light of science, can read and believe every statement of the Word of God regarding the resurrection, without seeing any necessity for attaching to the doctrine an interpretation which appears to them to be not only very improbable, but also very unimportant.

When the resurrection of the saints has been accomplished, the trumpet shall sound again, and then the saints, who are alive and remain, and who will, no doubt, be dwelling in every country round the whole earth, will hear that last great trumpet-call, and will feel an instan-

* See Appendix N.

taneous change. In a moment, in the twinkling of an eye, corruption shall put on incorruption, and the mortal shall put on immortality.

Then shall the Lord send forth His angels, and gather the elect from every country throughout the whole world, into one vast assembly, which will then rise from the earth to meet the Lord in the air, and so shall they ever be with the Lord.

CHAPTER XXXIV.

THE EMPLOYMENTS OF THE REDEEMED AFTER THE
RESURRECTION.

UNTIL the day of their resurrection, the redeemed are represented as having entered into their rest, and fallen asleep in Jesus. After their resurrection, such a state of inaction would be unworthy of the high destiny to which they are called, and for which they will then be so gloriously equipped. If their present mortal bodies fit the spirit for high enterprise and active labour, how much more active must they be when that which is sown in weakness shall be raised in power! With bodies possessing all the attributes of material manhood, and, at the same time, all the spiritual immunities of angelic natures, there seems to be no end to the variety, as well as the grandeur of their occupations. Like Christ and the angels, they will be able to walk and to sit, to eat and to drink, on such worlds as this; but they will also be able to pass through material obstacles, or to mount through the air, and wing their way from star to star upon the errands of their Master. Gifted with noblest thought, and endowed with high intellectual powers, they will be able to fulfil their commissions in the distant worlds to which they may be sent. Happiness is produced by the exercise of our faculties; if, therefore, the faculties of the resurrection body be not exercised, a great source of pleasure will be lost;

and it is only because our weak powers of imagination are unable to fathom the future glories of God's administration, that we feel at a loss when we attempt to anticipate the employments of the sons of God. Eye hath not seen, ear hath not heard, neither hath it entered into the heart of man to conceive what is laid up for those who shall be thought worthy to attain to the resurrection of the dead. We may, however, in imagination, be able to realise, in part, the future history of our occupations, by accompanying such an one as Gabriel in one of his angelic pilgrimages. It is in the days of Darius the Mede, who reigned over Chaldea, more than five hundred years before the birth of our Saviour.

The captive Jews were, at that time, hanging their harps on the willows, beside the waters of Babylon, far from the loved land of their inheritance; but they had now nearly fulfilled the seventy years of their captivity, which had been predicted by the prophet Jeremiah. Daniel, who was one of them, and who had been elevated to the rank of one of the princes of the kingdom, had anxiously studied the prediction, and, finding that only about two years remained before the expected dawn of their deliverance, he resolved to prepare for this blessed consummation, by fasting, and supplication, and prayer. We are not informed regarding the length of the time thus devoted to his prayerful intercession before God; upon a subsequent occasion it occupied three full weeks, in which he ate no pleasant bread, and neither flesh nor wine entered his mouth; but upon this occasion, it appears to have lasted only one day, for we are told that the answer was received about the time of the evening sacrifice. Had it been more than one day, we should have been told, as in the 4th verse of the 10th chapter,

upon what day, rather than about what hour, he obtained the response from heaven.

"Whiles I was speaking," says he, "and praying, and confessing my sin, and the sin of my people Israel, and presenting my supplications before the Lord my God for the holy mountain of my God; yea, whiles I was speaking in prayer, even the man Gabriel, whom I had seen in the vision at the beginning, being caused to fly swiftly, touched me about the time of the evening oblation. And he informed me, and talked with me, and said, O Daniel, I am now come forth to give thee skill and understanding. At the beginning of thy supplications the commandment came forth, and I am come to shew thee; for thou art greatly beloved: therefore understand the matter, and consider the vision" (Dan. ix. 20-23).

At the beginning of his supplications, probably early in the morning of this memorable day of fasting and prayer, the commandment went forth to Gabriel from the throne of the Eternal, to fly swiftly to this earth on this errand of revelation. Swiftly he flew, no doubt, in obedience to this high behest—so swiftly, that he arrived upon our planet that same day, occupying probably not more than six hours, or, at the very most, ten hours in his passage.

But here the question occurs, how far had he to travel, and from what place did he come? We cannot answer the first question, but, in regard to the second, we may be assured that it was from some distant world in space. Was it from one of the sister planets of our own solar system, or was it from some other star, or rather some other system connected with our own Milky Way? There is still one other alternative: may it not have been from beyond the confines of even this great galaxy—from some

distant nebula that trembles in the field of our most powerful telescopes?

If so, it would not be difficult to imagine the scenes through which he passed in his stupendous flight. After springing upwards from the orb on which he lived, and bending his eye on the far distant point towards which his flight must be directed, he would press onwards with increasing swiftness, rivalling at length the velocity of light. In the first hour, he would have left behind him the firmament of his native world, and entered the great wilderness of the universe, where no single star was visible, and where the black vault above, beneath, and around, was sprinkled only with its distant nebulae. Here he is alone with God; and, probably, in the solemn silence of his solitary flight, is receiving upon his inmost spirit the prophetic message that he was to bear to earth.

For hours together the same dread grandeur of nebulous scenery would continue; and yet the inconceivable swiftness of his progress would produce, as it were, a moving panorama around him, the nebulae in front opening and enlarging themselves before him, passing on each side at greater and less distances, according to the line of his flight, and finally closing up and disappearing in the distant wake. Such would be the characteristic scenery of the greater part of his voyage. Like the vessel that leaves its port, and, after passing through a forest of shipping, and witnessing for a few hours the surrounding scenery of its enclosing bay, enters at length the wide ocean, and continues sailing there, perhaps for weeks, before it sees the corresponding scenery of the port to which it is bound: so would Gabriel's flight be one of weary sameness during the greater part of its continuance. Sometimes, no doubt, the strange outlines of the dia-

tant clusters would present interesting objects of study to the angelic astronomer. Ring-shaped nebule, contrasting with spherical or lenticular conformations; these would approach and enlarge, and, after decreasing again, would ultimately disappear. Grotesque arrangements of congregated stars, some like spiral comets, others like fringed crowns, some like tangled clouds, others like rocket showers, would appear to sail along the silent heavens as his flight bore on. Sometimes his way would lie so near their confines, that occasionally the form of some distant nebula would grow in brightness as it neared him, and, when it sailed closely by, perhaps only a few quadrillions of miles distant, it would expand and resolve itself into myriads of little stars, till, being past, it would again gather up its glories into some new and strange outline, and at length fade away in the ethereal distance.

Towards the close of his voyage, his course is directed to one particular nebula, from which he swerves not either to the right hand or the left. It is evidently the sought-for object of his flight. It is our Milky Way, although, as yet, it is no more than a small speck in the distant night. By and by it grows in brightness, and becomes more distinct in outline, like a small, flat cloud, split along one of its flanks. Onwards and onwards he flies towards this bourne, and, as he approaches, its outline gradually disappears, and the stars of which its dim light was composed disengage themselves, and open up on his field of view. Now he must gradually slacken his flight, because he is approaching the termination of his voyage. Like the ship entering the port of its destination, and passing through another forest of shipping, so would Gabriel find the stars of the Milky Way open out upon his view; and, gradually radiating from the central point

towards which his flight is directed, they would at length brighten into a starry firmament around, such as meets our admiring gaze on a cloudless and moonless night.

Having entered the firmament of the Milky Way, his eye is now directed towards a feeble, undistinguished star, upon which all his interest is concentrated. Swift as the light he makes towards it, and, as it brightens before him, he can look round and notice the same well-known stars and constellations that we are accustomed to see, with no great difference in their arrangements. There is Sirius, brighter than all beside; there is Orion, with his cloudy sword; there are the Pleiades, that vast system of congregated suns, around which our own appears to be revolving; there is the Southern Cross; and there are the glorious Magellanic clouds, from which, it may be, his morning flight began. The sky is blacker than night, and the stars sparkle with a brilliancy that no mortal eye has ever seen.

Meantime, his star has grown a sun—small, indeed, as the morning star, but dazzling with a light which no planet can ever equal. He has come within the orbit of Neptune, and there is Uranus with his moon, and there is Saturn with his moons and rings, and Jupiter, also, with his bands and moons. He can even perceive, in close proximity to the enlarging sun, a red speck, which is the planet Mars. But where is the Earth, of which he is yet in search? It is still invisible, because it is yet immersed in the solar rays. Onward he flies, and, entering successively the orbits of Uranus and Saturn, his piercing eye can now detect a little speck emerging from the glowing sunshine in which it was previously lost—it is the Earth at last. It brightens into a small blue star, growing richer and larger as he enters successively the orbits

of Jupiter and the Mero-planets; and when, at length, he has reached the orbit of Mars, the disc of the earth has become visible, and the rich blue tint of our planet is conspicuous over all the others.

Onward and onward the pilgrim angel flies, keeping our little planet still before him, until its growing disc expands into a gigantic moon; and, in a few minutes more, he dips beneath the blue atmosphere that covers the Babylonian plains, and lays his hand upon the prostrate Daniel. It is the time of the evening oblation.

CHAPTER XXXV.

THE GEOLOGY OF THE MOON.

(A CHAPTER ADDITIONAL TO THE FIRST PART.)

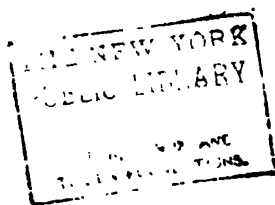
IN preparing the previous chapters for the press, and, after the first part had been printed, the author was led to pass under review the various phenomena connected with the moon, and to examine whether they might not be accounted for, without supposing that there is any difference between the materials of our earth, and those of which its satellite is composed. The speculations to which this inquiry gave rise involve so many interesting questions, that, although he has not had time to subject them to careful scrutiny, he cannot deny himself the present opportunity of offering them to the consideration of others, as well as himself.

There are five grand enigmas which present themselves for solution when we study the constitution of the moon.

1. Why should the moon's rotation on its own axis so exactly coincide with its revolution round the earth?
2. Why should the moon be so much lighter than the earth, in regard to its specific gravity, if it be composed of the same kind of materials? Its proportionate density is only 615, supposing the earth's specific gravity to be 1000.
3. How can we account for those strange geographical



SECTION OF THE MOON
Its Crust — Interior Atmosphere and Nucleus.



features which we observe in the moon, particularly those great circular basins, multitudes of which cover so large a portion of its surface?

4. How can we account for the entire absence of an atmosphere around the moon, and the want of water on its surface, if the moon be composed of the very same kind of materials as the earth? Were there no gaseous oxides produced during its formation? Was there no hydrogen present to form water, no carbon to form carbonic acid? Or even, in the absence of these, how can we account for the fact, that so large a body as the moon should fail to attract towards it a condensed envelope drawn from the general atmosphere of the solar system?

5. How can we account for those luminous spots which appear on the darkened surface of the moon, sometimes equal in brilliancy to stars of the sixth magnitude, when we know, from observation, that there are no living volcanoes at present existing upon it?

These are the questions which we now propose to answer, believing that all of them may be satisfactorily disposed of, on the supposition that the materials of which the moon is composed, are in no respect different from those of the earth, and, indeed, that the whole of the five phenomena may be explained more easily than if any one of them had been wanting.

Let us then suppose that the moon, when the oxidation of its materials was completed, formed a mass of liquid incandescent lava, surrounded by an atmosphere of common air, saturated with aqueous vapour, in the same proportions with the atmosphere and ocean which have fallen to the share of the earth. That is to say, as the

earth is eighty times heavier than the moon, there would be a gaseous atmosphere one-eightieth part as great as our own atmosphere, and an amount of aqueous vapour suspended in it equal to the eightieth part of our ocean. This, of course, is no part of the theory: it might be much less or much greater—probably it was less, because the distance of the atmosphere would weaken its attraction, and gather a smaller amount of general atmosphere from the surrounding space. We merely accept the problem in this form as the simplest in which it may be put.

We also suppose that, besides a revolution round the earth, the incandescent mass had a rotation on its own axis, say in ten hours, as we find Jupiter have at present; and, in that case, there would be a tide passing round it every five hours, many times higher than the ocean tide caused by the attraction of the moon, because the attraction of the earth is eighty times greater. Were such a tide as this to take place in a globe formed entirely of water, the friction would not be very great; but in a ball of thick and viscid lava, however incandescent it might be, the friction would be enormous—the force would be converted into heat, and a constant and powerful drag would be established on the rotation of the moon. Its day would, in this manner, be gradually lengthened from ten hours to twenty, thirty, forty, and so on, until the minimum of friction had been attained; and this would not take place until the time of its rotation on its axis coincided with its monthly revolution round the earth; because then there would be no tide at all produced by the earth's attraction.* *May not this account,*

* This is what is taking place upon the earth every day, the friction of the tides is gradually reducing the velocity of the earth's rotation on

therefore, for the moon always presenting the same hemisphere towards the earth?

We must next observe that the appearance of the moon's surface indicates an unchanging state of the crust. There is no action of tides, no formation of deposits, no gentle upheaving of one part, and no gradual sinking of another—all is fixed and at rest. It is not so with our earth, whose surface is undergoing a continual change. The gradual shrinking of the earth's material is caused by its constant cooling, so that the crust, which is lying loosely on the liquid lava, is always changing its position, in order to accommodate itself to its narrowing bed. If the earth had been able to gather a crust at the time when its specific gravity was no greater than the moon's, its diameter would have been upwards of a thousand miles more than it is at present; and if it had been able to maintain the crust unbroken, the crust would eventually have parted company with the liquid lava below, which would always be decreasing in size, and, by this time, have formed a rocky firmament above, more than five hundred miles distant. Supposing, then, that the same laws which we find operating on the earth now, have been operating also on the moon, and that the materials of which the earth is composed are not greatly different from those which form the substance of the moon, is it not possible that the disc which we now see is in reality the old shell of the moon as it existed ages ago, unchanged in size for perhaps millions of years; and that the nucleus beneath

its axis, and increasing the length of its day. The time is probably coming when our day will be equal to a lunar month, and then one of the sides of the earth will turn constantly towards the moon. The distance of such a period, however, is almost beyond calculation.

has gradually shrunk into much smaller dimensions, leaving a vaulted interval between the two, perhaps a hundred or a hundred and fifty miles in depth all around? and *may not this account for the smaller specific gravity of the moon as compared with that of the earth?*

Let us next attend to the effect which would be produced when the crust had been partially formed, and was still resting on the liquid lava below. If this took place before its independent rotation on its axis had entirely stopped—that is to say, before its *day* had become as long as our *month*—there would still be a tide of lava passing slowly round the moon very many times higher than the tides of the earth. By its powerful action the crust of lava, while not very strong, would be cracked into fragments, like an ice-field over a swell, and would heave upwards and downwards with the tide, like a jointed armour, without being cast loose or overlapping itself. This movement, however, would at length cease, as soon as the cooling had proceeded so far as to cement the joints, and convert the crust into a rigid mass; more especially, if its unequal thickness permitted the tide to break through numerous openings, and thus permit a comparatively free passage to its rise and fall. *May there not be some connexion between the basin-shaped cavities and valleys of the moon, and the supposed ebbs and flowings of the internal lava?*

Whether this be the case or not, these mountain circles must have been formed at a time when the molten lava was nearly on a level with the external crust. When it had subsided so far as to sink below its inferior surface, the form of the crust would be, to a great extent, unalter-

able. It might, indeed, happen that, at a very early period, the condensation of water from its enormous atmosphere might produce a stream of sufficient magnitude to cause an explosion, and even to fracture the crust when it found its way downwards through some of the fissures into the lava below; but even this would, after a time, be impossible, and the molten nucleus would be allowed to retire in peace further and further from the rocky vault above. The atmosphere of the satellite would gradually follow it, and when at length it had retreated some hundred or hundred and fifty miles distant, no trace of the atmosphere would be discovered outside, the whole of it would be contained below. *May not this be the reason why astronomers fail to detect any refraction of the light of a star, when it is close upon the moon's limb? It is occulted while yet two hundred miles perhaps from the real body of the moon.* Our own atmosphere does not extend to more than eighty miles above the surface of the earth, if even so much, and its greatest refractive power is in its very lowest regions. The moon has, most probably, a much more extensive atmosphere than ours, because it is loaded with all the aqueous vapour of a sea probably not less than the eightieth part of our ocean. Astronomers, when looking for an atmosphere, naturally expect that if there be one, it will increase in density according to somewhere about the square of its nearness to the surface, and that the change produced by refraction should, on that account, be sudden, if it existed at all. This, however, according to the views now suggested, would not be the case, and, therefore, the existence of the lunar atmosphere must be tried by measurements not of relative, but of absolute time, because the refraction may begin when the star is yet at a considerable distance from the moon. It may be

that there is none, but of this we have not as yet any proof which would be valid under this new hypothesis. When we remember the great amount of elasticity which the presence of aqueous vapour imparts to atmospheric air, it would not be surprising if the lunar atmosphere were found to extend to a considerable distance beyond the moon's surface, although, of course, it would be in an exceedingly attenuated state, and altogether unobservable except by the most delicate measurements.

There is yet one other phenomenon which we have to notice, and that is the luminous spots which are so frequently observed on the darkened surface of the moon's disc. These are found in different places, but the most important is one in the centre of the great crater called Aristarchus, the interior of which goes down more than four thousand feet below the level of the moon's surface. Dr Herschel says, in April 1787, "I perceive three volcanoes in different places in the dark part of the moon. Two of them are already nearly extinct, or otherwise in a state of going to break out; the third shews an eruption of fire or luminous matter." On the next night he says, "The volcano burns with greater violence than last night; its diameter cannot be less than three seconds, and hence the shining or burning matter must be above three miles in diameter. The appearance resembles a small piece of burning charcoal when it is covered with a very thin coat of white ashes, and it has a degree of brightness about as strong as that with which such a coal would be seen to glow in faint daylight." Admiral Smyth, who also felt deeply interested in the matter, thus records his views: "This naturally brings me to a particular mention of the occasional luminous appearances which have so repeatedly attracted the attention of astronomers, and led to the conclusion of

there being active volcanoes in the moon. This may be told by an extract from a letter which I addressed to Mr Francis Baily, on the 30th of December 1835, as inserted in the third volume of the Royal Astronomical Society's *Monthly Notices*, p. 141: 'It is very desirable, in order to arrive at stronger conclusions, to draw more attention to the very remarkable luminous appearance so frequently seen in the dark part of a young moon, and which we readily enough ascribe to its being enlightened by the earth in an early stage of her age. Yet, it is difficult to account for the different degrees of intensity under which this luminosity is seen at different epochs. I myself have observed it of every size from the sixth to the tenth magnitude. As it is always at or near the centre of Aristarchus, there can be no doubt of its being the identical spot mentioned by Cassini, Sir W. Herschel, and Captain Kater, and also that described by Dr Maskelyne, in the 84th volume of the *Philosophical Transactions*, which was seen by the naked eye, by two persons, in March 1794.

"As, from the absence of the sun, this is the favourable season for looking out for the phenomenon, I will here give you the registered note of the observation, of which I sent you so hurried a notice; indeed, I wrote off instantly, hoping the weather might continue fine:—

"Dec. 22, at 6.30 P.M., the moon about an hour or more over the meridian, and 14° or 15° high; the weather fine, clear, and frosty, with a very light air from N.N.E.; the barometer was 30.46, the thermometer 33.2 , and hygrometer .717. Directed the telescope to the moon, and pointing it in the dark part for the vicinity of Aristarchus, soon saw the outline of that mountain very distinctly, formed like an irregular nebula. Nearly in the centre was a light, resembling that of a star of the ninth

or tenth magnitude; it appeared by glimpses, but at times was brilliant, and visible for several seconds together.

“‘I saw the same phenomenon to great advantage on Christmas-day of 1832, when it resembled a star of considerable size.’

“I should add that, though I have advanced no notions of my own on this subject, I am not at all surprised at its having been so repeatedly taken for a volcano.

“In reasoning upon inaccessible subjects, we can only proceed by analogy, and argue onwards from what we know; and since, on the earth fire cannot be maintained without air, we are justified in making the same assumptions respecting the moon. If De la Hire, Rochon, Bode, Olbers, and other Phlegæans, be right in their conjectures as to the actual existence of volcanic fires in our satellite, then is the contested point of the existence of a lunar atmosphere settled; but should time accept of the explanation afforded, by supposing polished surfaces at the summits of certain mountains, on a well-cooled moon, then are we where we were. Aristarchus itself calls for explanation, since the singularity of its appearance, as it is seen on the dark part of a young moon, is unquestionable. The hypothesis of a perfect reflecting surface in some degree affords an explanation; but the lustre appearing by glimpses only is rather against it, unless this can be referred to inconstant refractions in our atmosphere. As the enlightened limb enlarges, it advances into notice, till at length it becomes the brightest of the annular mountain chains, exhibiting a beautiful white light above the grey surface of the Porcellarian Sea, and in a very variegated district. Those streaky radiations, or divergent streams of light, such as are also magnificently seen

at Copernicus and Tycho, emanate from the outer margin of Aristarchus, and extend from its base to a distance of many miles. These have been pronounced to be flowings of lava, but they seem to run over hill and dale without being at all modified by them; others consider them as vast disruptions, but many difficulties oppose this supposition, and at present they are totally inexplicable.*

No wonder that astronomers were puzzled; there could be no mistake about the appearance of these sublunarean fires so long as the moon was dark; but, no sooner was the place lighted up by the sun, than all was found as quiet as an extinct volcano. Besides, the very existence of a fire implied an atmosphere; and the idea of a volcano without flame, or smoke, or vapour of some kind was incomprehensible. If these phantom fires, therefore, had any real existence on the surface of the moon, they would not have been very long in supplying an atmosphere of no ordinary density.

May we not solve the difficulty, by supposing that the crater of Aristarchus, and possibly other craters, communicate with the hollow interior of the moon, and that the light of the incandescent nucleus far below is that which produces the phenomenon? That it should be inconstant and often invisible need not surprise us, when we remember that an atmosphere much more extensive than our own, and, probably, subject to much greater vicissitudes, lies underneath; so that under any particular spot we might have the bright nucleus within entirely hidden by dense clouds, and at other times seen brightly through a comparatively open atmosphere.

What a delightful field for speculation does this pre-

* Smyth's *Cycle of Celestial Objects*, vol. i. p. 126.

sent to our friends, the advocates of the universal habitability of the stars! We have been looking to the wrong side of the moon for its inhabitants, and mourning, very unnecessarily, over a scanty, or rather an absent atmosphere. Let us take a peep within, and then what do we see? a concave world—where gravitation is so equally divided, that, while we walk the inverted crust,* we may almost choose to fly up into its cloudy atmosphere. Care must be taken, however, not to go too far; for at a certain distance we should find the gravitation change, and then we might have a chance to tumble upwards to the fiery nucleus itself. On the concave crust, however, we are very safe, and even comfortable. We live under the smile of a perpetual day, and enjoy the warmth of a *very* decided summer. Above us is a firmament of cloud varying in density, and affording a grateful shelter from the too fervid rays of an ever noon-day moon. If we should find the atmosphere too close, even this might have a remedy, because those very openings which have bothered our astronomers without, might be the means of enlightening the astronomers within, and health and science might be delightfully associated in many a pleasant visit to Aristarchus. We recommend the subject to our friends, for it is not by any means exhausted.

* This would require the crust to be very thick in order to produce such a result—still it is possible.

APPENDIX.



APPENDIX.

A.

THE EARTH'S CHEMISTRY AN EXHAUSTED CHEMISTRY.

THE rocks, and clays, and sands, and soils, of which the earth's crust is composed, or with which it is covered, along with the watery contents of the ocean, are so neutral and quiescent in their nature, so little likely to take fire on the one hand, or support combustion on the other, that we are apt to suppose that, if the rest of creation were all like them, they would not be subject to any change, nor be capable of originating any action or producing any power. But when we discover that these rocks and seas are the remains, or rather the products, of a former combustion; and when, by means of chemical research, we find that their original condition was very different, we open our eyes to a new and beautiful arrangement by which there resided, in the original elements of creation, a latent power which was capable of being developed in the formation of the planets, and which is at present in action in the formation of the sun and the stars. The chemistry of our earth is, in reality, an exhausted chemistry, dealing only with residuary materials which have expended all

their force. That we have any chemical action at all is due to two circumstances: the first is, that, in a manner which we shall afterwards explain, the rays of the sun restore substances to their original condition of separate existence. It divorces them, as it were, from one another, so that they become capable of contracting other unions; for a chemical action is the marriage or divorce of substances which are all, as it were, male or female.

The second is, that all substances have different degrees of preference for others; and, although at the formation of the earth by combustion two substances were, as it were, married to one another, yet their attachment may be weak; and another substance, more masculine than the husband, or more feminine than the wife, may cause a chemical divorce and another marriage. For example, such an exceedingly masculine substance is the metal potassium, and such an exceedingly feminine substance is oxygen, that they have the very strongest attraction towards each other. Water, it is well known, is a compound of oxygen and hydrogen (produced by flame); but the mutual attraction of oxygen and hydrogen is not nearly so strong as that of oxygen and potassium—the consequence is, that when a piece of potassium is thrown upon water, it robs the hydrogen of its oxygen, in order to form an oxide of itself (potash). The hydrogen thus set free takes fire, and unites with oxygen again to form water as before.

This division into sexes, however, must not be regarded as altogether definite, for it is rather a gradation than a division. There are extremes, no doubt—the extreme masculine, and the extreme feminine—as is the case with potassium and oxygen; but there are many substances between. Among the number there are some that marry

upon either side; and it depends on circumstances whether such a substance will take the place of a husband to a more feminine wife, or the place of a wife to a more masculine husband. Such a substance is sulphur; it is feminine when united to iron—it is masculine when united to oxygen.

Our unlearned readers will now more easily understand us when we say that the chemistry of the earth is an exhausted chemistry—all its couples are married; and were it not for the analysing or divorcing power of the sun's rays, there would be no chemical changes at all—all would be still as death.

This more delicate style of chemical action is absolutely necessary for our earth, as the abode of animal and vegetable life; but it suggests a very erroneous idea of the qualities of the substances which exist in space, and which give to the sun and the stars the light and the heat and the power which are peculiar to them as the sources of light and life.

The deoxidising power of the sun's rays, to which allusion has been made, constitutes the grand instrument of planetary life—and is a law of a very general character, which governs all chemical actions. To the popular reader it may be described as an *unburning* power—meaning by that, not the power of *preventing* combustion, but of *reversing* the process; the undoing of what has been done, or the restoring of that which has been burned to the state in which it was before it was burned. Chemical combination presents, as its general character, the act of *burning*; not that every chemical combination is what is popularly called burning, but burning is the *type* of chemical combination; for all chemical combinations partake of that character. The most common is the

union of oxygen with some other substance having a more positive polarity than itself—this is called oxidation; and, although oxidation frequently takes place so slowly as to present no appearance of combustion, yet, however slowly it takes place, the effects of combustion are always produced, viz., heat and electric disturbance.

If we regard oxidation as burning; then deoxidation (that is, the separation of the two substances from one another,) may be regarded as unburning, so that the substances are capable of being burned again. The reader will now be prepared to understand what is meant by the deoxidising power of the sun's rays. Every chemical combination produces an influence which tends to chemical separation; therefore, oxidation has the power of producing deoxidation; and burning has the power of unburning.

For example—the sun's rays put out a fire, by preventing the oxidation of the fuel; and when they fall upon the leaf of a tree, they deoxidise the water, and the carbonic acid gas. When wood is burned, the hydrogen and carbon, of which chiefly it is composed, are possessed of a strongly positive polarity; and, as the oxygen of the atmosphere is possessed of a strongly negative polarity, they unite with the oxygen when they are burned, and become oxidised; the hydrogen and the oxygen form water, and the carbon and oxygen form carbonic acid gas. But when the rays of light fall on the leaf of a tree, the water which the leaf contains, and the carbonic acid gas which is in the air, are subjected to the deoxidising power of the sun, which we have mentioned; the hydrogen of the water, and the carbon of the carbonic acid gas, are forced to separate from the oxygen, with which they were previously united—and with this hydrogen and carbon the tree forms

its wood, while the oxygen returns to the atmosphere, so as to be able to burn the wood again.

The same principle is exhibited in action in the galvanic battery, but in a different way. The galvanic battery depends for its power on the chemical action of sulphuric acid on the plates of zinc, of which it is composed; and the decomposing power is conveyed by the two wires, and applied to any substance which we wish to analyse. It is by means of this valuable instrument that we are able to undo the effects of the earth's former combustion, and to unburn the materials of which it is composed. By means of the galvanic battery, we can *unburn* the water, and change it into hydrogen and oxygen, as they existed at first; and, by the same means, we can unburn the rocks, and change them into metals and oxygen.

It is to this deoxidising, or unburning property of the sun's rays, as well as its heating power, that we owe all the action of animal and vegetable life. It appears as if it were also to this that we owe, in part, even the existence of oxygen in our atmosphere, and coal in the strata of the earth.

B.

THE LAW OF ROTATION.

THROUGHOUT the whole universe, so far as we have yet been able to discover, we find the heavenly bodies in a state of perpetual motion; not only revolving on their own axes, but travelling in their orbits round some central body, or turning, in company with their companion suns, round some common centre of gravity. This revolving motion is the product of two different forces: one, the force of gravitation drawing the bodies together; the other, a projectile force forming an angle with the line of attraction. In regard to the former of these, there is no difficulty, for although we may never be able to discover its cause, we know at least the method and law of its action; but in regard to the latter we are entirely ignorant,—we have, as yet, discovered neither the cause nor the law, and therefore we have it generally ascribed to the direct agency of an Almighty Creator, who, at the time when he first called the worlds into existence, and endowed them with the power of gravitation, communicated to them, at the same time, a projectile force, which, in concert with the law of gravitation, caused them to revolve both on their axes and in their orbits.

A transitive act like this, on the part of the Creator, is not in the usual style of God's operations, and mingles so obviously the miraculous with the natural, that we

hesitate to accept the explanation. At a time when science had not attempted to explain the formation of the world according to natural laws, and when it was supposed that the whole universe came forth from the hands of the Creator in the space of six days, in a state of perfect maturity, it was most reasonable to believe that the projectile force was a Divine impulse, which, after being once communicated, did not require to be renewed. In assigning to this force such an origin, it was by no means singular in that respect; and, had any attempt been made to account for it by natural causes, we should have regarded the inquiry as both unnecessary and absurd. Now, however, when the miraculous is so rapidly giving place to the natural, we feel as if this single element ought not to persist in being so singular; and that if it were rightly read, it would be found to be no miracle after all; more especially, as the progress of science seems to point to some such conclusion as this, that, so far as the *inorganic* creation is concerned, with the exceptions of the materials being at first called into being (and this must have been miraculous), the entire economy of nature has been elaborated, and is still sustained, without the aid of miracles. Every new discovery in natural science, therefore, increases our conviction that such a principle as this should be ascribed to the action of some yet undiscovered law, and that no miraculous agency is needed to account for it.

It is not necessary that such a law as this should be proved by experiment, for its action may be so delicate as to be inappreciable, except when exhibited upon a gigantic scale; it may be discovered by calculation, provided we have a sufficient number of known facts upon which to found a conclusion. Even in the absence of

sufficient materials for the establishment of a definite law, an approximation might be obtained, either within certain limits, or by means of alternatives.

Probably such an attempt would have been made, had it not been for one obstacle, which seems to frown upon us at the very outset. Every dynamical force that we are acquainted with, has a reaction equal to the force exerted. For example, when a ball is thrown from a cannon, the amount of recoil is an exact equivalent of the force given to the ball; and when the earth is attracted to the sun, the sun is at the same time attracted towards the earth to the very same amount. The difficulty does not consist in the mere circumstance of this projectile force always acting at an angle with the attracting force, for we have already discovered such a force in electro-magnetism; but even here we find that, when one body is made to revolve round another, *there is always a reaction*, the central body being as much inclined to move in one direction as the revolving body in the other. This electro-magnetic force is a most tantalising representative of the very thing that we want; magnetism bears so strong a resemblance to gravitation, that, if we could discover anything that would bear the same relation to gravitation that electricity bears to magnetism, we could account for the revolution of the planets without the aid of a miraculous force. The want is most pressing—the inquiry is most inviting; we have discovered a companion force for magnetism, who shall discover the companion force for gravitation? We have obtained *electro-magnetism*; what we want is . . . gravitation: who shall supply us with the word?

But, as we have already stated, there is a preliminary difficulty. Supposing, that by experiment we succeeded

in discovering a force transverse to that of gravitation, we are not yet in circumstances to make use of it. If a transverse force existed between the sun and the planets, the force which moves the planets in one direction would react upon the sun, and cause him to revolve in the opposite direction; and the velocity of that movement would correspond with the velocity of the planets, taking into account their comparative masses and distances. Instead of this being the case, however, the perplexing fact presents itself, that the sun, instead of moving in an opposite direction from the course of the planets, moves in the same direction. Instead of reaction, there is a community of movement, and instead of a solution, we have an aggravation of the difficulty. Instead of seeking a law which will regulate a tangential force acting between the sun and the planets, we have to seek a tangential force operating without reaction, and therefore miraculous and Divine. Were it not for this, and in the absence of experiment, we might have evolved the law by calculation; because we could have balanced the one motion against the other, and, by a comparison of the different movements, have hunted out the law. But how shall we make any calculation of a force which has but one terminus—a lever which has no fulcrum—an effect which has no cause? and, so long as we understand the sun to revolve in the same direction with the planets, we have this difficulty standing opposed to us at the very threshold of investigation.

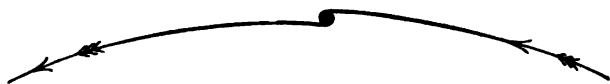
• We humbly think that this preliminary difficulty may now be set aside, for if we have any ground for supposing that the body of the sun is 170,000 or even 200,000 miles distant from the outer flame which we see, the movement of the outer flame does not necessarily indicate

the movement of the central body. The outer flame is, in fact, another planet revolving round the central body, and uniting with them, in forcing the interior sun to turn round in the opposite direction.

That the exterior flame has, to some extent, a different movement from the body of the sun, has been well ascertained, inasmuch as the different periods assigned to the sun's rotation cannot be ascribed altogether to inaccuracy of observation. Laugier, who has devoted particular attention to this subject, has observed spots which indicate a rotation of twenty-four days seven hours, and others which indicate a rotation of twenty-six days eleven hours. Here is a difference of more than two days in the entire revolution, which is about two hours of difference every day. The whole subject requires to be reinvestigated, with a view to ascertain whether the rate of motion can be reduced to any law, according to which different zones, or different periods, determine the velocity. It is also important that not only the size but the form of the sun should be subjected to a renewed scrutiny, to determine whether the orbit of the flame be circular or elliptical. If it be found that it is elliptical, we might yet discover the amount of eccentricity, by observing the rate of motion according to Kepler's law.

It might appear, at first sight, as if the rotation of the planets on their own axes, and in the same direction with their orbits, were as conclusive an objection to any relative transverse force, as the sun's rotation on its axis. It might be said, Where is there any reaction here? But the answer to this is very simple. If, by means of the sun's influence, a circular motion was established in the meteoric matter of the different zones from which the

planets were formed, that motion would be sufficient to originate the axial motion of the planet in the same direction. We find in the solar system, that the difference in velocity, at different distances, has produced a separation at regular intervals of the different zones, and that the accumulation of meteoric matter towards a central line in these zones kindled in each a star, which gradually attracted towards it all the meteoric matter which the zone contained. The combustion and formation of the planet would continue so long as the meteoric matter lasted, but when it was used up, the combustion would cease, and the sphere which had been formed would gradually cool, and become coated over with a solid film of oxidised matter. The rotation of such a planet on its own axis, as well as round the central body, would be a necessary consequence of such a formation. If we suppose the meteoric matter of the zone from which the planet was formed, to have been revolving round the sun at the time that the planet was a-forming; when the incipient planet attracted the matter which was *before* it in the orbit, it would drag it *backward*, so as to make it lose part of its centrifugal force, and on



that account incline *inwards* towards the sun. On the contrary, the meteoric matter of the zone that was *behind* and following the planet, would be attracted *forwards* in the orbit, so as to increase its centrifugal force, and cause it to incline outwards from the sun. Both of these forces combined would give the growing planet a revolving motion in the same direction with its motion in its orbit.

The satellites would appear to have been formed in the

same manner as the planets, a reaction taking place on the primary body, and tending to retard its rotation on its own axis, though not to destroy it. The phenomena of the planets and their satellites, may afford most important assistance in the search after the law.

Turning from the solar system to the binary, ternary, and multiple systems, which we find in the sidereal heavens, we have no difficulty in applying the principles suggested in this chapter to their formation. Each star, as it was kindled, would, by its tangential force exerted on its companions, produce a rotary motion round a common centre.

And now, where, or how, are we to look for the law? And here we must confess our utter ignorance. One or two thoughts only we would offer, in the form of questions, before closing.

1. Does not the fact of a revolution in one direction imply a polarity in the force, or something analogous to polarity? So that the positive polarity induces revolution in one direction, and negative polarity in another?

2. Is there anything analogous to polarity in the molecular properties of matter in its gaseous and its solid states? That is to say, is there a solid polarity of matter producing attraction, and a gaseous polarity producing self-repulsion?

3. May not two bodies, attracted towards each other, be subject to a tangential force in certain circumstances—perhaps according as they yielded to that attraction, or according to their relative heat, or their relative electric states?

4. If tangential motion produces radiating force (as suggested in page 62), may not the converse be true, so that radiating force may produce tangential motion?

C.

THE PERSONAL REIGN OF CHRIST.

THE present personal reign of Christ, and the prospect of His second coming, constitute the very soul of a living Christianity. Belief in the doctrines, and love to the cause, are good and powerful, but until Christianity has become a *personal* matter—that is, until we trust in, and love Christ as a *person* whom we *know*, it is not capable of exhibiting any remarkable effects, either in kind or quantity. We might as well expect the planets to revolve in their present orbits without a material sun, as a man to be powerfully influenced by an impersonal Christianity.

The religion of Jesus has now obtained a dominant ascendancy in the world; and its name has been assumed by a large body of mankind, who, having discovered its excellency and power, call themselves by its name, and have become advocates of its cause: but the price of their loyalty is a moderation of its pretensions. They like its abstract doctrines, and they admire its morality—as a code; but they think it may be carried too far, and, if received undiluted, they as thoroughly believe that it would end in fanaticism.

Now, this is simply a mistake—and we would invite every man who loves truth, to examine the matter philosophically, and to say whether this diluted Christianity, which is acknowledged to be the religion of Europe, is

really a thing of power. No doubt, it is immensely better than heathenism, but its professions and its powers are evidently inconsistent. For this reason it is the duty of every scientific man to view the matter in a scientific light; and, after carefully examining the Bible, to make up his mind as to the fact whether popular Christianity is an accurate representation of what he finds there. If it be not so, we would say that Christianity is entitled, at the very least, to get a full trial *as its Author Himself propounded it*, and not as we think it should be modified. Waving, at present, His right to demand its reception, we put it to every candid mind—and on purely scientific grounds—whether, since all acknowledge that Christianity has already accomplished a most wonderful success, even when partially adopted, it is not, on that account, entitled to an honest study and a fair trial?

D.

DATE OF THE MILLENNIUM.

IF the six days of creation symbolise the history of the Church and the world, may not the seventh day also symbolise the "millennium," or the world's rest of a thousand years? We are now far advanced in the sixth thousand years of the world's labours and unrest, and there is reason to believe that probably it is the last. Not to advert to the opinions of divines regarding the world's millennium, we have very distinct indications in sacred history of such a division of the world's week, the most remarkable of which is the birth of our Saviour on the fourth thousand year of the world. At first sight, this might appear a very equivocal correspondence with the creation of the sun on the fourth day, because the fourth thousand year was on that day completed; but when we remember that the temple of Jerusalem was built on the third thousand year, and was not only a visible type of Christ's body, but was to continue its worship until Christ himself appeared in it; we have, therefore, this central millennium entirely occupied in the manifestation of this great moral luminary—the evening and the morning were the fourth day. According to this view, the millennium need not be expected until after the sixth thousand years of the world's toil has been completed: that is, until the year of our Lord 2000; or rather (as we are told there is an error of four years in

our chronology) it will not take place till after the year 1996.

We arrive at this conclusion, not by any reference to prophecy, and yet it is remarkable that prophecy does furnish us with this same result. We have already remarked the intimate connexion between Christ and the temple of Jerusalem in a chronological point of view; and, accordingly, we find all prophetic eras in some way or other connected with it. The seventy years prophesied of by Jeremiah were the time when Jerusalem was to lie waste; and the prophetic weeks of Daniel were to commence from "the going forth of the commandment to restore and to build Jerusalem" (Dan. ix. 25), down to the time of the destruction of Jerusalem in the year 70, which is called the "consummation" (Dan. ix. 27).

It is an error to suppose that either the birth or the death of Christ formed any epoch from which St John's prophecy was to be counted. It was the destruction of Jerusalem and its temple by Titus that brought the Mosaic ritual to a full close. Up to that time the Jewish ritual was tolerated (Acts xxi. 21-26), and the temple sacred (Acts iii. 1); after that, the temple service was abolished, and, even in the opinion of the Jews, could not be re-established without a new revelation.

Having ascertained that the destruction of Jerusalem is the period from which the prophetic chronology of St John ought to be reckoned, there are no difficulties remaining. The number of the Beast, 666 (Rev. xiii. 18), gives us the date from which his life is to be counted; the 1260 days (Rev. xi. 2), or forty-two months (Rev. xiii. 5), are the lifetime of the Beast; and if we add these two sums to the year of the destruction of Jerusalem, we obtain the same date which we have above referred to.

				YEARS.
Destruction of Jerusalem,	.	.	.	70
Rise of Antichrist, . . .	.	.	.	666
Continuance of Antichrist,	.	.	.	1260
				<hr/>
				1996
Add error in Chronology,	.	.	.	4
				<hr/>
				2000
Years before Christ,	.	.	.	4000
				<hr/>
				6000
Millennium, . . . . .	.	.	.	1000
				<hr/>
The World's Week,	.	.	.	7000

E.

THE DECALOGUE AND THE LORD'S PRAYER BY THE
SAME AUTHOR.

IN the text we have been able to observe some similarity of expression in the two speeches of Gabriel, the one addressed to Daniel, and the other to the Virgin Mary; but a much more interesting identity of style is observable in those two great Divine compositions, "The Ten Commandments," and "The Lord's Prayer." There is a peculiarity of style in all the sacred writers, whenever God's messages have been communicated to us through human instruments—indeed, in some the peculiarity is very marked—but in the case of these Divine effusions, there was no created mind present to colour the ideas when they were enunciated.

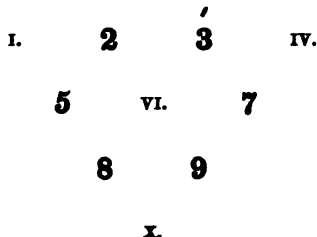
In the Ten Commandments, the division into two tables has always been a matter of observation. The first four commandments containing our duty specially to God, the other six contain the duties which we owe to our fellow-men.

There is a further division, however, in the second table, because we may observe in the first three, *i.e.*, the fifth, sixth, and seventh commandments, a compendious view of the law of the affections—filial, fraternal, and conjugal. These are distinguished in the Jewish code, above all that follow, by having the penalty of death attached

to them. There is also a natural order in their position, because the central law of brotherly love, and the sacredness of life, has, on the one hand, filial piety, and on the other, conjugal fidelity.

The remaining three commandments may be still further divided, not only because the tenth evidently stands out as distinguished from all the others in dealing with the heart only, and reflecting its influence on all that preceded it; but the eighth and the ninth are evidently a pair, inculcating honesty both in deed and in word, and affording protection both to property and character.

In this manner, we have a succession of numbers, which can scarcely be regarded as accidental; first 4, then 3, then 2, then 1, so that the decalogue really takes the triangular form, thus,—



In this visible arrangement, two characteristic features appear. We have three of the commandments thrown forward as outposts, so as to guard the inner circle, and in the centre of the six stands one which is surrounded and defended by all the others. It is not too fanciful, surely, to suppose that faith in God through Christ, the keeping of the Sabbath, and the guarding of the heart, are the three great outposts of the moral law,

which are intended as a protection against the assaults of sin; and it is always some of these three that is first assailed and carried, before a breach has been made in the others.

Still more evidently is there a meaning in the position of the sixth commandment, as the citadel of the whole. Life is protected there—love floats as the standard there, and death is the penalty of a broken law.

Viewed as presenting a threefold front against the assaults of Satan, the world, and the flesh, we may observe, that besides the first table presenting a peculiarity of character on one side, the other two fronts are likewise characteristic—that on the left being directed against bold and daring crime—that on the right denounces mean and hidden wickedness.

Such is the structure of the Decalogue, and similar is the structure of the Lord's Prayer.

I. I—Jehovah—thy God, which brought thee out of the land of Egypt, out of the house of bondage, thou shalt have no other Gods before Me.

Our Father.

II. Thou shalt not make unto thee any graven image, or any likeness of any thing that is in heaven above, or that is in the earth beneath, &c.

Which art in heaven.

III. Thou shalt not take the Name of the Lord thy God in vain; for the Lord will not hold him guiltless that taketh His Name in vain.

Hallowed be thy Name.

IV. Remember the Sabbath-day to keep it holy. Six days shalt thou labour and do all thy work; but the

seventh day is the Sabbath of the Lord thy God: in it thou shalt not do any work, &c.

Thy kingdom come.

V. Honour thy father and thy mother, &c. VI. Thou shalt not kill. VII. Thou shalt not commit adultery. (*These are the three great laws of the affections—filial, brotherly, and conjugal.*)

Thy will be done on earth, as it is done in heaven.

VIII. Thou shalt not steal.

Give us this day our daily bread.

IX. Thou shalt not bear false witness against thy neighbour.

Forgive us our debts, as we forgive our debtors.

X. Thou shalt not covet thy neighbour's house, thou shalt not covet thy neighbour's wife, nor his man-servant, nor his maid-servant, nor his ox, nor his ass, nor any thing that is thy neighbour's.

And lead us not into temptation, but deliver us from evil.

The apparent exceptions to the general correspondence of these two Divine productions are, perhaps, more instructive than all the rest. They reflect light mutually on one another, and are worthy of deep study. *

* The author published about fifteen years ago a fuller statement of the correspondence, to shew the light which they mutually shed upon each other, and to prove that *the Lord's Prayer is the Ten Commandments turned into prayer.*

F.

NOMENCLATURE OF THE STARS AND NEBULÆ.

It is remarkable that sidereal astronomy, which, from its nature, is more susceptible of an exact nomenclature than any other science, is as yet without one. We have, indeed, Arabic and classic names given to a comparatively small number of stars; but they are quite capricious in their character, and convey not the slightest indications of the nature or position of the stars which they represent. This inconvenience is especially felt in regard to the nebulae, and other remarkable objects in the heavens, which have no name whatever, and cannot be identified, unless we do as astronomers do—give the right ascension and north declination, with the epoch. Take, for example, a nebula in the constellation Dorado—its name at present is—

5 h. 39 m. 51 sec. R.A.—159° 9' 7" NPD. ep. 1850;
which is rather a long name when vocalised. It is true, we might refer to it more easily by calling it "No. 1838, British Association Catalogue," or "2007, La Caille," or "1038, Brisbane," or its number in any other catalogue in which it is found. But these are not its name, any more than "No. 4316, Wellpark Library" would be the name of "Zimmerman on Solitude," because it happened to have that number in that particular library.

According to the plan now proposed, it would be



referred to as situated in that compartment of the heavens called *Hava*, and that its name is *Zepo*.

To shew the confusion which at present prevails, we may refer to a very fine atlas of the stars, published by Sir John Lubbock, in which every star is named or numbered. Besides the Arabic and classical names, there are the designations of Bayer, Flamsteed, Helvetius, Piazz, La Caille, Sir W. Herschel, Sir J. Herschel, Mettler, and Mr James Dunlop—eleven different nomenclatures, eight of which consist of numerals, each set engraved in a different kind of character, and yet very apt to be confounded with one another. Nor does the inconvenience end here. If stars are to be identified by numerical figures under which they appear in different catalogues, there must, and ought to be, a perpetual change in the preference given to the catalogue most in repute. The catalogue which a few years ago was that in general use, is now superseded by a better; and it, in turn, will be superseded when a better shall appear. Besides, every catalogue, in order to be perfect, must have a column for almost every other that has preceded it; for, without this, the identification is not complete.

The means of remedying all this is so simple, that it scarcely deserves the name of an invention; it merely proposes to bring together, and to recognise as a system, conventional arrangements which already exist, and are universally adopted. It leaves the constellations unaltered, and dispenses with their boundaries—the names being founded on absolute, and not on relative position. The name of every star ought to be obtained from its position in the sky; and the easiest method of expressing it would be in letters, indicating its right ascension, in hours, minutes, and seconds. This would be quite sufficient for

ordinary purposes; but for minute telescopic stars, the plan might be extended, and the fraction of the second might be added. Instead, however, of expressing it by *tenths*, if we expressed it by *sixtieths* we should continue the series uniformly, and then the name of a star would be the expression of its time in "hours," "minutes," "seconds," and "sixtieths,"—60 sixtieths being a second—60 seconds, a minute—and 60 minutes, an hour.

To turn the numbers into names, we must convert the figures into letters; and if we take the twenty consonants, and vary them so as to form three series, we have a sexagenary scale, exactly suited to our wants. The variation may be accomplished in different ways. In *writing*, it is easiest to distinguish the letters of the second and third series, by underlining them—the second series having one line, the third series two lines, underneath. In *engraved maps* it is easiest to mark the letters of the second and third series by accents placed over them—the single accent marking the second, and the double accent the third series. In *speaking*, or vocalising the names, we may distinguish them by vowels; the first series may be vocalised by *a*, the second by *e* or *i*, and the third by *o* or *u*. In this manner the name of a star would be expressed in three or (in exceptional cases) four letters, or syllables.

The value of the letters might be as follows:—

0	ba	20	be	40	bo
1	ca	21	ce	41	co
2	da	22	de	42	do
3	fa	23	fe	43	fo
4	ga	24	ge	44	go
5	ha	25	he	45	ho
6	ja	26	je	46	jo
7	ka	27	ke	47	ko
8	la	28	le	48	lo

9	ma	29	me	49	mo
10	na	30	ne	50	no
11	pa	31	pe	51	po
12	ra	32	re	52	ro
13	sa	33	se	53	so
14	ta	34	te	54	to
15	va	35	ve	55	vo
16	wa	36	we	56	wo
17	xa	37	xe	57	xo
18	ya	38	ye	58	yo
19	za	39	ze	59	zo

The plan is susceptible of great variety of application. For example—the heavens may be divided into definite Compartments, and named, for convenience, by the right ascension and polar distance. Every hour of right ascension would divide in one direction, and every ten degrees of polar distance in another. Each hour would have a letter, and each ten degrees would have a letter; and these together would name the Compartment. This would also simplify the naming of the stars in each compartment, because it would cut off the first syllable; and in the catalogues each compartment would have its own stars; and, after each star, there would be, *first*, its north polar distance (in letters); *second*, its magnitude; *third*, its name, when it had any; and, *fourth*, the letters or numbers under which it appeared in other catalogues.

In translating the figures of the north polar distance into letters, it is an inconvenience that there are 180 degrees, which cannot be rendered by one letter: but it is easier to represent it by two, than to attempt any change. The decades of degrees, therefore, would be represented by the first letter; the units, by the second; the minutes, by the third; and the seconds, by the fourth.

The accompanying illustration represents the chief stars in the Pleiades, to shew the plan in operation both in

maps and in catalogues. Only those contained in the British Association's Catalogue are given. Towards the right, the map is not divided into minutes; to the left, it is. In either case, as many of the letters are put above and below the map, in the line of the division, as are common to all the stars which the lines enclose—the remaining letters, or letter, are attached to each star.

The following is a catalogue of the stars contained in the chart :—

CHIEF STARS IN THE PLEIADES (TAURUS).

Fa	Ja	Mag.	B.A.	B.	F.	Names.
Vesao -jo	(japapa)	5½	1146			Celeno
Veyo -se	(jacego)	4½	1147			Electra
Wesa -ra	(hayepa)	7	1149			
Wesa -ce	(jabahe)	5	1151			Taygeta
Weto -pe	(jajaya)	5	1154			Maia
Weyo -sa	(kazare)	7	1155			
Wezo -na	(hazoha)	7	1156			
Xeka -pa	(hawowe)	7	1157			
Xehe -ro	(japede)	5	1161			Merope
Yega -ma	(hawozo)	7	1163			Asterope
Yeje -va	(jacela)	7	1164			
Yete -ya	(janaho)	7	1165			
Yete -te	(jaceho)	3	1166			
Zele -de	(kadaye)	7	1170	η Ta.		Alcyone
Zete -re	(jakaja)	7	1171			
Boda -pe	(jaweera)	7	1173			
Bova -ca	(jagese)	5	1176			Atlas
Bowa -ya	(jazape)	5½	1177			Pleione
Boya -re	(jatepe)	7	1178			
Bohe -xo	(jagato)	7½	1182			
Bono -ca	(jagoto)	7½	1186			
Coba -vo	(jajano)	7	1187			
Cofa -pa	(jawewe)	7	1188			
Coxo -ke	(jumefo)	7	1195			

In this list, the first word in each line is the name of the star, composed of only two syllables; these, with the syllable over the column in which they are found, contain the hour, minutes, and seconds of right ascension. The

syllable following the hyphen contains the fraction of seconds in sixtieth parts—to be used when it is necessary to distinguish minute telescopic stars.

The second word in each line (*printed in italics*) is the *supplemental name* of each star, and, when added to the syllable at the top, expresses its north polar distance. The top syllable expresses the decades of degrees; the first syllable of the word contains the units of degrees, the second the minutes, and the third the seconds of degrees.

The next column contains the magnitude of each star.

The next is its number in the British Association Catalogue.

The next contains the letters of Bayer.

The next the numbers of Flamsteed, although it so happens that there are none here.

The next is the names, either Arabic or classical, by which any of them are known. The present list is peculiarly rich in these.

As the precession of the equinoxes produces a constant change in the right ascension and polar distance of the whole of the stars, the figures that express them at one time will not express them at any other—the consequence is, that whatever catalogue is used, the figures must be rectified to the time of observation. It is evident, therefore, that unless we are to be constantly changing the names, we must fix on some epoch as the time when the nomenclature is supposed to be made. The epoch of the present specimen is the 1st of January 1850, the same as is adopted by the British Association for their Catalogue. If such a nomenclature should ever be employed, the lines ought to be drawn as at 1850, with another set of lines drawn for 1950. These double lines would be of great use to shew the gradual change that is taking place every hundred

years; it would enable us also to calculate by the eye how far the precession would carry any star in a given time.

The present proposed nomenclature, or, indeed, any new nomenclature whatever, would not be required by practical astronomers, who have no need of maps, and scarcely ever use them; its great use would be for those who follow, at a humble distance, and to whom mere figures in catalogues are of no use.

It may be that the growing interest in nebulae and the interesting peculiarities which are observed in particular stars, will, at last, render it necessary to be able to give names, and, in that case, it is probable that some such plan as the present, modified or extended, will be brought into use.

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G.

DEMONIACAL TEMPTATION.

DURING the mesmeric sleep it is quite possible to awaken one or more of the faculties or instincts of the mind, while the others continue partially or even altogether in a state of repose; and as the means usually employed for this purpose is touching or causing the fingers to point energetically towards some part of the patient's head where the faculty is supposed to reside, the process has received the name of Phreno-mesmerism.

During these phreno-mesmeric experiments, very interesting and even wonderful manifestations are produced—the reality of which, in general, it is impossible to doubt. The person speaks and acts as if he were in a dream, or rather in a state of somnambulism.

The most usual and the most remarkable result is the working of the imagination in a particular direction. For example, when the instinct of fear (called caution by phrenologists) is excited, a strange undefined sensation of danger or horror is induced.

"In thoughts from the visions of the night,
When deep sleep falleth on men,
Fear came upon me, and trembling,
Which made all my bones to shake.
Then a spirit passed before my face;
The hair of my flesh stood up;
It stood still, but I could not discern the form thereof."

The imagination conjures up objects of terror with scarcely any assistance, but still more powerfully if they be suggested. Thus, if we say, "Do you not see that serpent in the corner?" the patient will not only believe that he sees it, but will fly from the supposed danger. If, on the contrary, the instinct of fondness for children (called *philoprogenitiveness* by phrenologists) be called into action, and if a pillow be put into his arms, he will believe it to be a child, and will fondle it with a delight that is exceedingly amusing; and so also it is with all the other instincts,—the imagination is excited in the direction of each one as it is called into action, and a sort of waking dream is the consequence.

Another evident and important effect of calling out particular faculties during the mesmeric sleep, is their immediate tendency to run into action. For example, when the faculty of *number* is excited, the patient begins to count, and feels an evident pleasure in counting; if *tune* be excited, he begins to sing; if *combativeness*, he begins to fight; if *veneration*, he begins to pray.

Very interesting effects also are sometimes produced by the combination of different faculties. Thus, *veneration* and *tune* combined will incline the patient to sing psalms. *Self-esteem* and *language* will unite in causing the patient to boast; and so on with all the others—the one either modifies or counteracts the others.

Those who have had opportunities of witnessing these experiments, must have been struck with the light which they shed upon the science of the human mind. On one occasion, two young gentlemen, on returning from a phreno-mesmeric lecture, and, believing that the experiments which had been exhibited were merely a well-

executed piece of imposture, proposed, as a frolic, to repeat them on one another. Neither of the two was a believer either in mesmerism or phrenology; and when, to his surprise, one of them succeeded in throwing the other into a mesmeric sleep, he proceeded to experiment upon the phrenological organs. Still more to his surprise, on putting his finger to those organs the position of which he knew, the corresponding dispositions and faculties manifested themselves exactly in the same manner as had been done in the experiments of the lecture. The most remarkable circumstance, however, was this, that, being acquainted with the position of only a few of the organs, *none of the organs of which neither of them knew the position would come into action; whereas those which either the one or the other knew responded at once to the call.*

On another occasion, during a private but rather extensive exhibition of phreno-mesmeric phenomena, two gentlemen, who were rather sceptical on the subject, were among the company, walking up and down the apartment surrounded by sleeping patients, of very varied characters. They stopped before a little boy who was fast bound in mesmeric sleep, and one of them said aloud, "Here is a fine little fellow; let us try the *new* organ of tune on him," and immediately he laid his finger lightly on the boy's *nose*—forthwith the boy began to sing. This incident convinced the gentlemen that the boy was an impostor; a conclusion by no means likely, and certainly not justified by the circumstances. It proved this, however (and the previous anecdote seems to corroborate the doctrine), that the faculties of the mind may be called into action, not merely by touching particular parts of the head, but by directing the attention of the

patient to the faculty which is appealed to. Nor is it even necessary that the patient should know what is expected from him. If the mesmeriser's attention be directed to the faculty, the "*rapport*" which is established between the two is sufficient to excite the faculty into action. If the patient be capable of feeling the taste of salt put into the mesmeriser's mouth, and will start when the mesmeriser is pricked with a pin (and such cases have been well established), it is quite possible that the act of the mesmeriser's mind may be sufficient to destroy the repose of a particular faculty, and call it into exercise, while the other faculties are still at rest.

In this view, it becomes a question whether all the experiments which seem to establish the truth of phrenology by means of mesmerism, are, in reality, admissible as proof. It would almost be necessary to have them tried by two persons (the mesmeriser and the mesmerised), neither of whom had *ever* known anything about phrenology. In making this statement, however, the author does not mean to offer any opinion on the truth of phreno-mesmerism, because, although this precaution seems to be necessary, he must acknowledge that the experiments he has witnessed, and in which he is certain there was no collusion, made a very deep impression on his mind. One particular instance will never be forgotten.

A middle-aged man, in humble life, but a professed atheist, was introduced at a private meeting, and thrown into the mesmeric sleep. A number of organs were appealed to, and came into action with considerable variety of energy; and, when little or no action was exhibited, the question was put, "What are you thinking about?" the reply was then always in character. One

gentleman, however, who was aware of his atheistic opinions, took an opportunity of appealing to the organ of "veneration," which, in general, exhibits itself in action by the patient falling on his knees, and engaging in some act of worship. In this instance, however, it appeared to have no power, and the man continued at rest. Anxious to know whether any action had been excited in the organ, the gentleman asked, "What are you thinking about?" The immediate reply was, "I am just thinking about the wife and the bairns at hame." A general laugh among the gentlemen followed, as if this part of the experiment had proved a decided failure: the effect on the author's mind was different; he thought not only that the organ had been called into action, though feebly, but that it had also exhibited the true type of its character, which he judged to be "the sense of sacredness." The objects most sacred in the estimation of this atheist, were evidently "the wife and the bairns at hame."

The organ of combativeness was next appealed to. The man instantaneously started from his seat, with an energy too violent, and a countenance too terrific to be fictitious: as he laid about him with a frenzy which seemed almost devilish, it was with the greatest difficulty that he could be held by several strong men (and he was not himself a very strong man), till the mesmeriser's fingers could be pointed to the organ of benevolence, to allay the storm of passion which had been so imprudently excited. The partial tranquillity which succeeded this disagreeable alarm, was almost immediately broken; and those at a little distance were startled by seeing a more feverish excitement seize upon the gentlemen around the patient, and looks of distress

and anxiety indicated that something was wrong. On making inquiry, after the tumult had somewhat abated, the author was informed, that in his struggles with those who were holding him, the collar of his coat had pressed upon the organs at the base of the cerebellum, and produced a violent excitement, which those around him were most anxious to allay.

It is quite possible that this man may have been well acquainted with the locality of the different phrenological organs, and that the mental functions were called into action, not because they were connected with particular portions of the brain, but because they were suggested by the power of association with the supposed bumps; as was the case with the boy whose nose suggested the idea of tune. At the same time, it is difficult to suppose that it really was so, for nothing can be more certain than this, that the man was no party to any attempt at collusion. On being restored to his usual state, his manner exhibited a state of considerable exhaustion, and an apparent disagreeable suspicion that he had, somehow or other, made a fool of himself, during the time that he was in the mesmeric state.

Whether phrenology be true or not, the phreno-mesmeric experiments are exceedingly suggestive; and if ever our philosophers shall be disposed to travel beyond metaphysical "psychology," in order to investigate what may be called the physiology of the spirit—the phenomena of insanity, mesmerism, and every other abnormal manifestation of mind, will be found to be the true objects of study which surrender to human inquiry the great secrets of our being.

Without attempting to enter into any regular inquiry respecting this deeply interesting subject, it will be desir-

able to notice two or three principles, or truths, which the phreno-mesmeric phenomena appear to establish.

First, We discover, that although the faculties, or instincts, of the human mind are probably the same in all, they differ in different individuals as regards power and readiness to come into action. The combative disposition, for example, exists in all; but in some it is more sensitive, or more energetic, than in others. In one man it may be so feeble, as to be with difficulty roused into action. In another, it may be so strong and so sensitive, that in a moment it may kindle into ungovernable fury. This difference is the result, not merely of the natural temperament or original constitution, it arises chiefly from the effects of discipline and habit. Every time that a faculty dominates, it grows stronger by exercise; every time that it is overpowered, it becomes weaker. How important are the lessons we draw from this simple principle!

Second, We find that every faculty or instinct, when excited singly, goes into action without restraint, and with lawless impetuosity: but it may be modified or subjugated by other faculties. Thus, acquisitiveness when acting alone will seek to gratify its lust by snatching at everything within its reach; but if love of approbation be aroused at the same time, a conflict of passions will ensue, the issue of which will depend on the comparative power which each may possess at the time. If the covetous propensity be the more eneregetic of the two, it will continue in action, though with less impetuosity; if, on the contrary, it be weaker than the other, its action will be altogether checked. If conscientiousness, veneration, and benevolence, be excited, the result will be, repentance and restitution.

Third, We discover the intimate connexion between Imagination and Will—they both result from the excitement of a faculty, or instinct. Inclination, or Will, excites the Imagination, and Imagination excites the Will; or, to speak more correctly, the activity of the instinct produces a corresponding imagination; and an imagination (even though suggested by the senses) produces an excitement of the instinct. How many practical lessons does this truth also suggest! In this view, it can scarcely be said that Imagination and Will are faculties; they appear to be only functions belonging to every faculty. Perhaps Will is not the best term to apply to the function—Inclination is probably more correct; and then Will would express the result, or the sum, or the balance of the inclinations, which proceeds to action.

Fourth, When a faculty or instinct is aroused, its imaginative functions reproduces previous experiences; and, if the other faculties be asleep, a dream, or vision, is the consequence. In our waking moments these fantasies constitute a very useful and important part of our inmost feelings and ideas; flitting with the rapidity of thought across the mind,—combining, conflicting, dissolving, they form, as it were, the background of our cogitations. But when the mental iris contracts, and dulls the perceptive powers, as in sleep, it is these imaginings that brighten into an apparent reality; and it is only when the eye and ear again open to the outward world, and admit the light and din, the action and turmoil of external things, that the more vivid impressions of the bodily senses overpower the more feeble light of the imagination.

Thus far we are conducted by science; we now turn to Scripture: and there we find that these secret springs of

human action and emotion are subject to the influences, not only of the world and the flesh, but of the "prince of the power of the air; the spirit that now worketh in the children of disobedience." In many passages of Scripture we are assured that Satan influences and tempts mankind to sin, by internal movements, as well as by outward circumstances.

"And Satan stood up against Israel, and provoked David to number Israel" (1 Chron. xxi. 1).

"When any one heareth the word of the kingdom, and understandeth it not, then cometh the wicked one, and catcheth away that which was sown in his heart" (Matt. xiii. 19).

"Those by the wayside are they that hear: then cometh the devil, and taketh away the word out of their hearts, lest they should believe, and be saved" (Luke viii. 12).

"And the Lord said, Simon, Simon, behold Satan hath desired to have you, that he may sift you as wheat: but I have prayed for thee, that thy faith fail not" (Luke xxii. 31).

"And supper being ended, the devil having now put into the heart of Judas Iscariot, Simon's son, to betray him" (John xiii. 2).

"And when he had dipped the sop, he gave it to Judas Iscariot, the son of Simon. And after the sop Satan entered into him. . . . He then, having received the sop, went immediately out; and it was night" (John xiii. 26, 27, 30).

"But Peter said, Ananias, why hath Satan filled thine heart to lie to the Holy Ghost, and to keep back part of the price of the land?" (Acts v. 3).

"Give yourselves to fasting and prayer, and come together again, that Satan tempt you not for your incontinency" (1 Cor. vii. 5).

"Lest Satan should get an advantage of us; for we are not ignorant of his devices" (2 Cor. ii. 11).

"In whom the god of this world hath blinded the minds of them which believe not, lest the light of the glorious gospel of Christ, who is the image of God, should shine unto them" (2 Cor. iv. 4).

"Neither give place to the devil" (Eph. iv. 27).

"Put on the whole armour of God, that ye may be able to stand against the wiles of the devil" (Eph. vi. 11).

"For this cause, when I could no longer forbear, I sent to know your faith, lest by some means the tempter have tempted you, and our labour be in vain" (1 Thess. iii. 5).

"And that they may recover themselves out of the snare of the devil, who are taken captive by him at his will" (2 Tim. ii. 26).

"Resist the devil, and he will flee from you" (James iv. 7).

"Be sober, be vigilant, because your adversary the devil, as a roaring lion, walketh about, seeking whom he may devour: whom resist stedfast in the faith" (1 Pet. v. 8, 9).

Making every allowance for the figurative style of Eastern language, there still remains in these passages sufficient to shew that the human heart was then, and still continues to be, exposed to the arts and influences of an unseen spiritual world.

He is but half a philosopher, whatever be his acquirements in particular sciences, who has not the humility to admit the possibility of such a doctrine. Let us take a very ordinary illustration: unless we had seen with our own eyes the magnetic needle trembling on its pivot, and yet pointing with determined constancy to the pole, we

never should have been disposed to admit that there is an unseen but powerful current of invisible energy streaming through air, earth, and ocean—through every substance, organic and inorganic—through the walls of our houses—through the bodies of animals—through our very heart and our very brain, ready to exercise its mechanical power wherever a magnet may be found or placed. The true philosopher will never say that anything is impossible; because he knows that we see only the surface of things; and that there lie beneath, and above, and within us, principles which we do not know and cannot understand; but which, meeting us at every turn, teach us that the docility of the child is the genius of the philosopher. The true Pharisee of science is no other than the Sadducee of revelation.

When we have admitted the reality of the demoniacal possessions recorded in the New Testament, there is no difficulty in understanding, or rather of expecting this modified agency of unclean spirits: in the one case, they took possession of the entire person; in the other, they merely influence or excite the faculties to action; with more or less power, according to the activity of the unclean spirit, or the passivity of the person who is tempted.

It is not necessary that we should know *how* the spirit operates, although it would be easy to speculate upon the subject; it is sufficient to observe what are the grand facts of the doctrine:—

1. It appears that Satan delights in tempting, overcoming, and destroying men (1 Pet. v. 8), more especially God's own people (Luke xxii. 31).

2. He exhibits great art and subtlety in his modes of attack (2 Cor. ii. 11).

3. He skilfully takes advantage of circumstances favourable to his designs (1 Cor. vii. 5).

4. He tempts to sin by stimulating pride (1 Chron. xxi. 1), covetousness (John xiii. 2), love of applause (Acts v. 3), fear (Luke xxii. 31), and lust (1 Cor. vii. 5).

5. By occupying the mind with worldly thoughts and imaginations, he prevents the truth from reaching the attention and the heart (Luke viii. 12; 2 Cor. iv. 4).

6. We have it in our power to encourage or resist successfully, by God's help, the temptations of Satan (Luke xi. 22; 1 Pet. v. 8, 9; James iv. 7; Eph. vi. 11; Luke xxii. 32).

7. When the temptations of Satan are not resisted, they become snares and chains out of which it is difficult to escape (John xiii. 2, compared with verses 26, 27, 30; 2 Tim. ii. 26).

We have only further to observe, that, in all these passages, the temptation is ascribed to Satan, or the devil (*διάβολος*, not *δαίμων*), and yet it does not follow that the agents are not the demons, under their prince, the devil. They are spoken of collectively in the New Testament under the name of Satan and the devil, in passages where we are sure that this is the case; for example, Christ's ministry is thus spoken of by Peter (Acts x. 38): "He went about doing good, and healing all that were oppressed of the devil" (*διάβολος*); and again, when the apostles returned and told Christ how the devils (*δαίμονα*) were subject to them, Christ said, "I beheld Satan as lightning fall from heaven" (Luke x. 18). We should not be warranted, therefore, in making a distinction between the agency of the unclean spirits and Satan their prince; and indeed, unless we had very strong statements to the contrary, we must suppose that Satan is a finite being, who can be engaged in only a limited number of acts at the same time, whereas the temptations of mankind must be carried out by innumerable agents under his com-

mand. We deplore the fact that his kingdom is at present so strong; but, blessed be God, we are assured that the time is rapidly approaching when it shall be utterly destroyed.

H.

SCIENCE OF FORCE AND SPIRIT.

THE science of FORCE, which at present occupies so much of the attention of scientific men, will yet, in all probability, be the greatest of all the sciences; or rather it will be the central science from which every other will depend.

We have stated in the text that light, heat, electricity, magnetism, and momentum, are all of them only different forms of one substance or essence, which, for want of a better name, is called FORCE; just as, in the mercantile world, sovereigns, shillings, and pence, are merely different forms of MONEY; and, as we can have a *pound of money* in the shape of a golden sovereign, or 20 silver shillings, or 240 copper pence, so may we have a *foot-pound of force* in the form of so much light, or so much heat, or so much electricity, &c.

The tendency of recent research has been to lead to the supposition that *light* is nothing more than vibratory motion, and *heat* nothing more than circular motion. The remarkable agreement of the phenomena of light and heat, with certain calculations that have been made upon this theory, invests it with a very high degree of probability. But where is this to end? If light be a vibratory motion, and heat a circular motion, what kind of a motion is electricity? or magnetism? or any of the other

forms that force assumes? We must also keep in mind that, in connexion with these other forms, there are attractive influences without motion; and what are we to make of them, as well as of the other forms which force assumes, when it ascends into the vegetable and animal kingdoms? There is one attraction of chemical affinity, another of electricity, and a third of magnetism; what kind of motion can account for the sympathy existing between objects under their influences at a distance from one another? And yet heat is capable of being converted into these very sympathies; will mere circular motion accomplish this?

The solution of this difficulty is quite consistent with the dynamic theory of light and heat. The phenomena of light may be produced by vibratory motion, and the phenomena of heat by circular motion, and yet these motions may be produced by something else, which is not motion, else would these motions continue for ever. A circular motion, *subject to mere mechanical law*, can never transfer its force to anything which does not come within the radius of its circle. If, therefore, we find that the force is transferred to some object that does not come within its radius, we must conclude that the motion is not subject to mere mechanical law, and that there is something behind, or within, of which it is merely the effect. It is quite possible, therefore, that sound, and light, and heat, are merely varieties in the mode of action of one of the forms which force assumes (*viz.*, momentum); but momentum is something more than motion, because it can be converted into electricity and other forms which are not motion.

It is of importance to institute a close examination

into the nature and qualities of the different forms of force, with a view to their classification, so that we may be able to detect any general law to which they are subject, and, more especially, that we may recognise each of them in its ascent into organic life.

Without presuming to claim for the following any great degree of accuracy, we offer it as a crude specimen of the sort of thing that would be desirable:—

CLASSIFICATION OF THE INORGANIC FORCES.

The phenomena of inorganic nature appear to be caused by the combined action of two kinds of forces—the transitive and the intransitive.

I. THE TRANSITIVE FORCE

is essentially *one*; but it manifests itself under different forms, viz, LIGHT, HEAT, ELECTRICITY, MAGNETISM, and MOMENTUM: these are—

1. Convertible into each other, without loss, gain, or decay.
2. Capable of passing from one substance to another.
3. Possessed severally of radiative, polaric, and dynamic properties.

II. THE INTRANSITIVE FORCES are these—

1. Chemical affinity. (Atomic attraction.)
2. Elasticity. (Atomic repulsion.)
3. Gravitation.

Character.

1. These forces are inherent, unchangeable, and intransitive.
2. By their means alone the transitive force is capable of acting on matter.

3. By their means alone the transitive force is capable of becoming latent.

Thus,

- a. By means of *chemical affinity*, transitive force becomes latent in chemical analysis.
- b. By means of *elasticity*, transitive force becomes latent in liquefaction and evaporation.
- c. By means of *gravitation*, transitive force becomes latent when it separates gravitating bodies.

The deepest interest is attached to the last of these intransitive forces—gravitation. Its similarity to the two other intransitive forces (atomic attraction, and atomic repulsion) and also to one of the forms of transitive force (magnetism), would lead us to expect, that, like them, it might be subject to some law by which its intensity might be varied or inverted. In regard to *atomic attraction*, or chemical affinity, we can destroy, or at least overpower it by electricity, and we can intensify or weaken it by heat or cold. In regard to *atomic repulsion*, or elasticity, we can increase or diminish it also by heat or cold. In regard to *magnetism*, to which gravitation bears the strongest resemblance, we can not only increase or diminish its intensity, but we can even make one body either attract or repel another at our pleasure. Gravitation, on the contrary, has, as yet, resisted every attempt to modify or interrupt its action—heat, cold, and electricity, have all been found absolutely powerless in producing the slightest variation in the intensity of gravitation—one body attracts another with the same power, under all circumstances, in the inverse ratio of the square of its distance.*

* Professor Faraday has recently startled the scientific world by ques-

But the mere fact that we have hitherto failed in discovering a variation, does not imply that we shall always fail; and still less does it prove that it does not exist. The fact that the spiritual bodies of Christ and the angels are able to rise from the ground into the air at one time, and at another to stand, and sit, and walk, as we do, affords strong reason to suspect that a higher law exists to which gravitation is subordinate—in the same manner as magnetism is subject to electricity. The attraction of iron to a magnet is, like gravitation, in the inverse ratio of the square of its distance; but in one moment the polarity may be changed by a change in the electricity, and that which before was attracted is now repelled. Atomic attraction, in like manner, is subject to variation. In some substances its intensity depends on the presence of heat, as in gunpowder; in others, on light, as in photography; and it is well known that, by the action of the galvanic battery, or even by the actinic rays of the sun, the most powerful chemical affinities may be dissolved.

We are not to expect, however, that gravitation is to be mastered by any other inorganic force, or force in any of its inorganic forms; if it were so, we could scarcely have failed to detect some indications of it in inorganic nature. It is in the higher spheres of organic life that we discover symptoms of such a principle. In vegetation, for example, inorganic affinities are reversed, and motions

tioning the usual definition of gravitation, as being opposed to the doctrine of the conservation of force; and he has raised no little storm among the mathematicians. Were it any other than Professor Faraday, we might assume that they are all right, and he all wrong; but, on this subject, we have every reason to believe that he has got a glimpse of some far-off truth "looming in the distance." Who knows but some startling revelation awaits us, which will place gravitation, when under the direction of some spirit-power, side by side with convertible force?

are produced which cannot be accounted for by the action of force, in any of its inorganic forms. Physiologists know and acknowledge this, but they can neither account for it nor assign any limit to the dominating power of life.

Before leaving this interesting subject, we may observe that, in the various ascents of force, there is what we may call an alternating or oscillating tendency, between synthesis and analysis, between composition on the one hand, and decomposition on the other. Thus, the materials of creation, as we have shewn, existed at first in the analytic or uncombined form, and at that time force existed in a latent state. The next succession is, that of composition or combustion, but of an inorganic kind. The oxygen and the metals unite to produce compounds, and heat, light, and electricity are evolved. The third action is again analysis—the rays of the sun decompose the water and carbonic acid gas in vegetation, and force again becomes latent; but now it has assumed an organic form. The fourth state is again combustion; but it is by means of animal life: carbon and hydrogen are again united to oxygen, and light, heat, electricity, and dynamic power are again evolved, but in a higher sphere. In each change there is an ascent, but it is an ascent by alternation; and if, as we have shewn, there is a still higher sphere into which force is to be translated, from the animal to the spirit-life, it is not improbable that we may discover the same principle of alternation prevailing; so that, as the forces that are developed by animal life partake of the character of combustion, so may the spirit-life, which is derived from it, partake of the analytic type of vegetation, which lives almost exclusively upon light.

The following is a tabular view of the various Ascents of Force, commencing with its originally latent state in the materials of creation; and ending in its supposed transition into spirit-life. At each change it oscillates between Synthesis and Analysis, always tending, however, towards equilibrium :—

ASCENT OF FORCE.

Analysis or { Separation. }	<div style="display: inline-block; vertical-align: middle;">SPIRIT LIFE.</div>
	<div style="display: inline-block; vertical-align: middle;">ANIMAL LIFE.</div> <div style="display: inline-block; vertical-align: middle; font-size: 2em; margin: 0 10px;">}</div> <div style="display: inline-block; vertical-align: middle;">Synthesis or Combustion.</div>
Analysis or { Separation. }	<div style="display: inline-block; vertical-align: middle;">VEGETABLE LIFE.</div>
	<div style="display: inline-block; vertical-align: middle;">INORGANIC COMBUSTION.</div> <div style="display: inline-block; vertical-align: middle; font-size: 2em; margin: 0 10px;">}</div> <div style="display: inline-block; vertical-align: middle;">Synthesis or Combustion.</div>
Analysis or { Separation. }	<div style="display: inline-block; vertical-align: middle;">MATTER as CREATED.</div>

Although we may not be able to explain *how* the spiritual body is able to rise from the ground, and pass from one star to another (and science does not deny the possibility of such a thing), of this we are sure, it must be accomplished according to law,—that is to say, there must be an *expenditure* of force, according to the amount of gravitation overcome, when the body *ascends*, and a *production* of force, to the same amount, when the body *descends*. There can be little doubt that, as we ascend in the scale of creation, the capability of storing force is increased; so that, whether it be by means of food, or whether in the higher grades of spiritual organisation, we shall be able to convert light and heat immediately into spirit-force, and store it in such a manner as to give significance to Paul's description, when he says of the spiritual body that "it is raised in power;" in either case, a certain amount will be required, and the source will be no other than that which moves tides, steam-engines, and muscular fibres,—it will be nothing else than the fall of meteorolites, and the oxidation of metals. It has been calculated that the combustion of one grain of coal produces as much force as would raise a body 143 pounds in weight, eight feet from the ground; and, therefore, the rising of ten miles from the ground would represent a force equal to that produced by the burning of nearly a pound of coal. In like manner, the descent of a body 143 pounds in weight, ten miles to the ground, would produce an amount of force equal to the combustion of a pound of coal, and this *must* be developed in its descent, however it may be disposed of. All this science can affirm; but it cannot affirm that the force of gravitation cannot be converted into another force, so that a spiritual

body may be able to rise into the air. It can only affirm that gravitation, though it may be converted, cannot be destroyed.

The power of storing latent force is of great importance to spiritual bodies, because if they can store the force that is *produced* by *descent*, the same force may be *expended* in a subsequent *ascent*; and, when the body has reached a distance so great as to make the influence of gravitation imperceptible, the force expended in producing motion would continue to increase the velocity of the body to any amount; for, like the planetary motions, in space, its movement would continue for ever, until it is checked. If the spiritual body be able not only to convert light into momentum, but momentum into light, may not the glorious appearance of the angels be assumed at will, and thus be the result of law and not of miracle?

The penetrable power of spiritual bodies is more difficult to be understood than their rising in the air, and yet the true philosopher will never pronounce anything to be impossible, merely because he cannot understand it. For example, the following is the report of a paper read at a meeting of the Meteorological Society last spring:—

“PHOTOGRAPHIC EFFECTS OF LIGHTNING.—At the last meeting of the Meteorological Society, there was read a paper on the photographic effects of lightning, by Andrès Poey, director of the observatory of Havanna. The first (though not the earliest) authentic mention of this singular phenomenon, was made by Benjamin Franklin, in 1786; who frequently stated that, about twenty years previous, a man who was standing opposite a tree that had just been struck by a thunderbolt, had on his breast an exact representation of that tree. (After mentioning

six other cases of a similar kind,) Mr Poey concluded this part of his paper by an instance mentioned by him in his 'Memoir on Lightning-storms in Cuba and the United States.'—On the 24th July 1852, a poplar tree, in a coffee plantation, being struck by lightning, on one of the large dry leaves was found an exact representation of some pine trees, that lay at the distance of 339 metres (367 yards 9 inches). As to the theoretical explanation of lightning impressions, Mr Poey thinks that they are produced in the same manner as the electric images obtained by Moser, Riess, Karsten, Grove, Fox Talbot, and others, either by statical or dynamical electricity of different intensity. The fact that impressions are made through garments, is easily accounted for, when we remember that their rough texture does not prevent the lightning passing through them with the impression it has received. To corroborate this view, Mr Poey mentioned an instance of lightning falling down a chimney, and passing into a trunk, *in which was found an inch of soot, which must have passed through the wood itself.*"

A statement like this is made before a learned society, and whether it be true or not, is heard with respectful attention. It is quite impossible to explain these phenomena, according to our generally received opinions regarding optics on the one hand, and the properties of soot and wood on the other—and yet they are not denied as necessarily false. The present state of science can no more explain the passage of soot through the wood, than it can the passage of the angel into Peter's prison, or Christ's passage into the closed room in Jerusalem: and yet these greater facts are better authenticated than Professor Poey's.

I.

THE SUN'S CLOUDY ENVELOPE.

THE discovery of a cloudy envelope, forming a continuous stratum between the photosphere and the corona, is one of those contributions to our knowledge of solar physics, whose great value consists in the light which they shed on other phenomena presented by the sun. Its existence was first distinctly announced by Mr Swan, of Edinburgh, in 1851,* who describes it as a *fourth* envelope, distinct from the third mentioned by Arago, in which he supposed the clouds, or red prominences, to float. Arago suggests that these clouds produce the isolated spots of the sun, where there is an umbra without a nucleus. Mr Swan, on the contrary, assigns to them a far more extensive and continuous prevalence, and rather attributes to their unequal density the mottled appearance which characterises the entire disc.

K.—(Page 90.)

THE COLOUR OF THE EARTH AS A STAR.

IN consequence of the great variety of colour which the darkened surface of the moon presents, when partially enlightened by the reflection of the sun's light from the earth, some ingenious speculations have been indulged in to account for it. On some occasions it has a reddish look, at other times it has a greenish tint, but in general an ashy grey. This has suggested the idea, that the variety of tints is caused by the different portions of the

* Transactions of Royal Society of Edinburgh, vol. xx. part 3.

earth's surface which are presented at different times to the moon. The Atlantic and the Pacific Ocean, for example, it is supposed, might reflect one colour on the moon, while the continents, either of sand or savannahs, would reflect others. This is a very unlikely supposition: the difference of tint on the earth's surface is too slight to be observable beneath the bright blue of the atmosphere; but the atmosphere itself must be subject to considerable changes of colour, grey, red, and blue, according to circumstances. One great cause of difference of tint will probably be found in the whiteness of the equatorial regions being presented to the moon when its declination is great; but whether this be so or not, we may safely say that we are to look to the atmosphere, and not to the earth's surface, as the cause.

K.—(Page 192.)

TRANSFORMATION OF HEREDITARY TYPES.

THE truthfulness of Scripture has been challenged by some bold *savants*, on the ground that there is no such thing as a transformation of hereditary types. They admit that crimes, or misfortunes, may transmit their malignant influence downwards through a few generations; but the constant tendency of nature is to recover itself and return to its original type. For this reason they object to the doctrine of the Fall of man as a physiological blunder; and, moreover, they hold that Adam could not be the common father of all mankind, because the Negro and the European could not be descended from the same parent. We fully admit that there is no such thing as a GRADUAL transformation of hereditary types, and, therefore, whatever has been accomplished by gradual cultivation or domestication is not a permanent change. A European

race could never become black by living in Africa, and a Negro race could never become white by living in Europe. We have even proof in ancient Egyptian sculpture, that, a few generations after Noah, the Negro race had the very same physical peculiarities by which they are marked in the present day.

But we do not admit that there are no **SUDDEN** transformations of hereditary types: on the contrary, we have proof, not only in Scripture, but in natural history, that there are. The tailless cats of the Isle of Man is a familiar example. There was no *gradual* transformation of hereditary type in their case—a gradual shortening of the tail, “small by degrees, and beautifully less,” until there was no tail at all. It was a *sudden* change, and, consequently, there is no disposition to return to its original type. This one fact is sufficient to establish the existence of the law, because it is well authenticated; and, therefore, we argue that there must be a **LAW OF SUDDEN TRANSFORMATION OF TYPE**.

There must have been something in this particular case which fulfilled the conditions of the law! The experiment might be tried a thousand times, and we should probably find that in every instance the experiment would prove a failure. Why? We cannot tell, because we do not know the law; but, if we knew the law, and could again fulfil its conditions, there can be no doubt that the experiment would be successful—nature is not capricious.

Now, we would ask our unbelieving friends, “How can you prove that *there are no circumstances* under which sudden transformations of types may take place according to law? Perhaps you will say that this affair of the existence and origin of tailless cats is not well authenticated. Well—we never heard that stated before. But,

supposing we admit it—what then? *Would you believe it if it were well authenticated?* If you say, No, then we cannot reason with you, because you are not to be convinced by facts. But if you say that you would believe it if it were well authenticated, then we ask, Why do you not believe in Adam's fall, which is well authenticated? You reply, 'But it is *not* well authenticated.' That is enough—we thank you for your admission; your objection to the doctrine is not its impossibility—not that it is unphilosophical, but simply because, *on other grounds*, you do not believe that the Bible is the Word of God. Your argument, on your own shewing, is not an argument against the Bible, but is actually founded on the conclusion you intend to draw from it."

L.

THE ANGELS THAT KEPT NOT THEIR FIRST ESTATE.

THE light of Scripture does not safely lead us much beyond the propositions of the text, and yet we have some very interesting indications, which, so long as we do not attach too much value to them, we are quite at liberty to notice and keep in store for future study, either to be corroborated by subsequent discoveries, or contradicted by clearer light. The inductive style of inquiry deals with evidence in such a way as to allow a value to even the faintest impressions; and, so long as we do not suppress counter-evidence, or ascribe more importance to such impressions than is right, we are at liberty to entertain them as legitimate hypotheses, however feeble, waiting for corroboration or contradiction from further inves-

tigations. In this spirit, let us examine the following passage in Jude 6, 7 :—

“And the angels which kept not their first estate, but left their own habitation, he hath reserved in everlasting chains, under darkness, unto the judgment of the great day. Even as Sodom and Gomorrah, and the cities about them (*περὶ αὐτὰς*), in like manner (*ὡς ὁμοίον τοῖς αὐτοῖς ἔργον*), giving themselves over to fornication (*ἐκπορεύσασαι*), and going after strange flesh (*σαρκὸς ἐρέπας*), are set forth for an example, suffering the vengeance of eternal fire.”

Here we are informed, that the angels which kept not their first estate, *left their own habitation*. May not this imply that the power of passing from one world to another is possessed by the unfallen angels before the complete development of their spiritual nature? We find it possessed by the “angels of God,” or the “angels of heaven,” and the resurrection body of the Lord Jesus; and, but for this passage, we should suppose that it could not be exercised until the spiritual body had reached its full development. May it not be that this particular power of locomotion is the first of the changes that take place on the psychical body?

In the seventh verse we are apparently informed that the sin of these angels was that of aggravated fornication—going after other flesh, or unlawful kinds of fleshly gratification. This shade of meaning is not brought out in our English translation, in consequence of the English pronoun “them” having no gender, as it has in Greek. The passage may be translated thus:—

And the angels which kept not their first estate, but left their own habitation, he hath reserved in everlasting chains, under darkness, unto the judgment of the great day, even as Sodom and Gomorrah, and the cities about

them (*fem.* the cities), in a manner like to them (*mas.* the angels), giving themselves over to fornication, &c.

The only grammatical meaning which can be given to this passage, seems to be that the cities of the plain were guilty of crimes similar to those of the angels; that is, out-prostituting themselves (*ἐκπορεύσασθαι*), by going after strange flesh. The *τούτοις*, which is masculine, cannot apply to the cities, which is feminine, but only to the angels; and if the sin of the cities was similar to the sin of the angels, then these angels must have fallen from their first estate in consequence of their intermarrying with "strange flesh."

If this be the case, does it not shed some light upon that passage (Gen. vi. 1, 2), where it is said,—

"And it came to pass, when men began to multiply on the face of the earth, and daughters were born unto them, that the sons of God saw the daughters of men that they were fair; and they took them wives of all which they chose."

Commentators, of course, if they believed that the angels had no bodies, but were pure spirits, would feel it necessary to reject the obvious and primary meaning of the passage, because it involved an absurdity. But if it be true that the sons of God have first the psychical before they have the spiritual body; and if it was possible for the sons of God to leave their own habitation in one star to visit another, such as this world, then it was also possible for them to see the daughters of men, and to take them wives of all which they chose. If it had been only the intermarriage of the sons of Seth with the daughters of Cain, we would not expect that the progeny of such marriages would have been very remarkable; but we are informed that they were very remarkable, for it

is said, "There were giants in the earth in those days; and also after that, when the sons of God came in unto the daughters of men, and they bare children to them, the same became mighty men of old, men of renown."

The flood, which took place one hundred and twenty years after, swept the corrupted race from the earth, with the exception of Noah and his family, and, as it is said that Noah was "*perfect in his generation*," an expression which is applied to no other person in Scripture, and which, possibly, means that none of this alien blood had been allowed to taint his pedigree, not a vestige of this vitiated population was allowed to survive. There is, perhaps, little force in this, and yet there is a concurrent stream of indications all in this direction. Thus, Peter speaks of the flood in connexion with the angels' sin:—"For if God spared not the angels that sinned, but cast them down to hell, and delivered them into chains of darkness, to be reserved unto judgment; and spared not the old world, but saved Noah, the eighth person, a preacher of righteousness, bringing in the flood upon the world of the ungodly" (2 Peter ii. 4, 5).

If this be the history of some of the demons, it may account for what would otherwise not be easily explained, viz., that they are reserved, with the wicked of our own race, to be judged at the great day. If, like the holy angels, they belonged to other portions of the universe, it would seem strange, or at least unexpected, that they should be brought to this world for judgment; but if they sinned here, and their bodies lie buried here, it is most natural that, at the second resurrection, they should rise with the wicked, and share their fate.

But it would also prove that the devils belong to more than one race of fallen angels. The old serpent the devil

(διάβολος), who tempted our first parents, was a liar and a murderer from the beginning—before the sons of God intermarried with the daughters of men, and this may open up interesting subjects of contemplation in regard to the nature and personality of Satan.

M.

OUR LORD CRUCIFIED ON THURSDAY, NOT ON FRIDAY.

It may seem presumptuous to call in question an opinion so long and so universally entertained, as that which fixes Friday as the day of the crucifixion; and yet it will be found, on examination, to be one that is not only directly contradicted, both by Scripture prophecy and Scripture history, but, when that one passage which has been referred to in the text, has been explained, there remains not even the shadow of a reason why it should be entertained any longer. The reasons why the crucifixion could not have been on Friday, are—

1. *Because Pilate would not have commenced a crucifixion within nine hours of the Sabbath, more especially as that Sabbath was a high-day.* Crucifixion is a lingering death; and criminals often lived for days after being nailed. When Joseph applied for the body that same evening, Pilate *wondered* that he should be dead so soon. If he expected him to live much longer, he would not have crucified him so near the Sabbath.

2. *It is impossible that all the events which took place between our Lord's death, and the beginning of the Sabbath, could have taken place in three hours.* Our Lord was alive at three o'clock (the ninth hour), the Sabbath began on

Friday afternoon, at six: let us examine what took place in the interval:—

(1.) The Jews besought Pilate to have the bodies buried before Sabbath. When Pilate assented, the soldiers broke the legs of the malefactors, and pierced the side of Jesus.

(2.) Joseph went into Jerusalem, and begged the body of Jesus. Pilate sent to Calvary for the centurion. On receiving his report, he granted Joseph's request.

(3.) On receiving permission, Joseph, in concert with Nicodemus, made preparations for the burial—and purchased fine linen. Nicodemus also bought a hundred pounds weight of a mixture of myrrh and aloes. They then brought them to Calvary.

(4.) They then took down the body from the cross, and wound it in linen clothes, with the spices, and laid it in the tomb. After all was completed, they rolled a great stone against the door of the sepulchre, and departed.

(5.) The women who had been sitting over against the sepulchre, beholding how and where He was buried, returned to Jerusalem, after all was completed.

(6.) On their return to Jerusalem, they bought sweet spices, and prepared them and the ointment for anointing Him.

(7.) When all this was completed, they rested on the Sabbath-day, according to the Scripture.

It is evident, that as Joseph did not leave the cross, to go into Jerusalem, until the even was come, it would be very late before the work of burial was completed. When the women returned to Jerusalem, it must have been still later, so that they could not purchase the spices till next morning. The purchase and preparation of the spices, &c., would occupy the whole of Friday, until evening, when the Sabbath overtook them, and

then they had to wait till the Sabbath was past. The sealing of the sepulchre, and the setting of the watch, must also have taken place after Joseph and Nicodemus had returned to Jerusalem.

3. *If Jesus was crucified on Friday, his resurrection would not correspond with the prediction in Matthew xii. 40: "For as Jonas was three days and three nights in the whale's belly, so shall the Son of man be three days and three nights in the heart of the earth." And also in John ii. 19, 20: "Destroy this temple, and in three days I will raise it up. Then said the Jews, Forty and six years was this temple in building, and wilt thou rear it up in three days?"* If our Lord was crucified on Friday, and rose very early on Sunday morning, then he was scarcely two days and two nights among the dead. Supposing him to die immediately after three o'clock on the day of his crucifixion, and to rise before six on Sunday morning, he was only two nights, and only three hours more than one day. This might be said to be two days and two nights, but it could not be called three days and three nights.

Granting that when the third day is spoken of, it might mean three days, either inclusive or exclusive of the day on which he suffered, in making our choice of the two, we must not choose the interpretation which cannot be reconciled with the others; we ought rather to choose the interpretation which, being more natural in itself, is, at the same time, in harmony with all beside.

The disciples going to Emmaus said to Jesus, "This is the third day *since* these things were done." If they had taken place *on Saturday*, it would have been only *one day since* these things were done. If they had taken place *on Friday*, then it would have been *two days since*

these things were done; but if it was on *Thursday*, it would have been, as it really was, *three* days since they were done.

It is difficult to understand how such a mistake could have arisen from the one verse in *Mark*, which we have quoted, since it, more plainly than any other, fixes the day to be *Thursday*. There is only one other that might mislead a very hasty thinker. It is in *John* xix. 14: "And it was the preparation of the passover, and about the sixth hour: and he saith unto the Jews, Behold your King!" The preparation of the passover might be confounded with the preparation of the Sabbath. It is very evident, however, that the preparation of the passover must be the day before the passover, when they prepared the passover,* just as the preparation of the Sabbath is the day before the Sabbath. Had we, from other passages, ascertained that the morning and not the evening of the crucifixion was the preparation of the Sabbath, we might conclude, that the preparation of the passover and the preparation of the Sabbath were the same; but when, from other passages, we ascertain that it was the evening of the crucifixion that was the preparation of the Sabbath, and the morning of the crucifixion the preparation of the passover, there is no reason whatever for supposing them to be the same.

* The preparation of the passover was the time when they *slew* the lamb: they did not sit down to eat it till the evening was come, which was a new day, the day of the passover. Christ our passover was slain, therefore, on the preparation of the passover, not on the preparation of the Sabbath.

N.

ILLUSTRATION OF THE IDENTITY OF THE RESURRECTION
BODY.

A VERY beautiful illustration of the identity of the resurrection body is to be found in the sculptor's studio. The soft clay model, after it has received the last touch from the sculptor's hand, is ready to be cast; it cannot continue in its present state, for if the clay be allowed to dry, it will shrink, and crack, and fall to pieces, and, therefore, a more enduring material is required. To obtain this, it is covered with an envelope of plaster, which receives an exact impression of its form, and, when that has been obtained, the clay is of no further use; it is, therefore, carefully picked out from the mould in which it is enveloped, until not a particle of it remains, and now the clay lies on the floor in fragments, ready to be modelled into some other form. The mould which has been thus obtained by the destruction of the original, may be kept for years without being used, but it is capable of reproducing the original as soon as plaster is poured into it. When that has been done, and the mould has been broken off from around it, the figure is restored, and every touch which had been applied in modelling the clay is now reproduced in a more enduring material. No one ever thinks of questioning the identity of the figure in such circumstances; why then should we question the identity of the resurrection body?

THE END.



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